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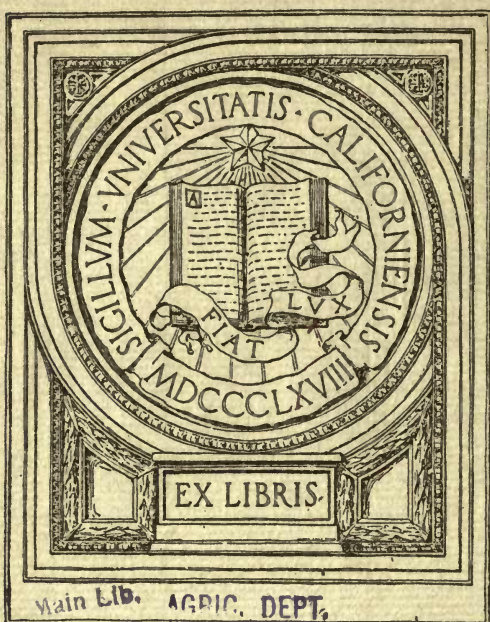


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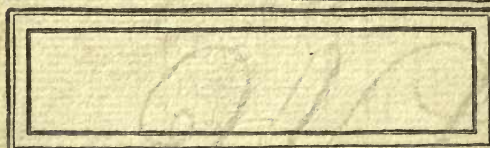
COMMERCIAL GARDENING



EDITED BY
JOHN WEATHERS



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Commercial Gardening



COMMERCIAL GARDENING

A PRACTICAL & SCIENTIFIC TREATISE
FOR MARKET GARDENERS · MARKET
GROWERS · FRUIT FLOWER & VEGE-
TABLE GROWERS · NURSERYMEN ETC.



*By Many Practical Specialists
under the Editorship of*

JOHN WEATHERS

*Author of "A Practical Guide to Garden Plants"
"French Market Gardening" "The Bulb Book" &c.*



In Four Volumes: Fully Illustrated

VOLUME II

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SECTION XII

Hardy and Half-hardy Herbaceous Plants, Bulbs, and Flowers

In growing hardy and half-hardy plants for sale the market gardener or nurseryman is guided by business instincts as to what will pay best, and not by sentiment. He crops his ground to the best advantage, planting in long straight rows when possible, to economize space, and so that he may have plants of any particular crop under his hand in bulk when he wishes to lift them. He cannot waste time running from one place to another for an odd plant, nor can he afford to waste space on any plant that will not sell fairly quickly, no matter how beautiful it may be in his own estimation. There is no attempt at landscape effect, the main object in view being to grow the plants as quickly as possible and sell them at the best price. For many kinds of hardy plants ordinary garden soil is quite good enough, and the more deeply it is cultivated, and the better manured, the better the results. In these days of keen competition, when plant growing has become a fashion with many more or less wealthy people, the man who produces the finest plants at a reasonable rate is the one who takes the lion's share of the receipts; while he who thinks that the old slovenly methods of his great-grandfather's days are quite good enough for modern cultural work must be content with prices that scarcely enable him to live.

For the cultivation of alpine and rock plants the ordinary soil of the garden may not be suitable, and it is generally more convenient for selling purposes to grow most of these plants in pots, and often in frames instead of planting them out. Supplies of peat, loam, sand, and leaf mould are therefore essential to the grower of special classes of plants, and it is not unnatural that he should look for higher prices for his labour and his produce. While it is not necessary to refer in detail to more or less scarce plants, those of the highest commercial value are more fully dealt with in this section. It is possible, however, that the rare plant of to-day may be the popular one of to-morrow.

Acæna.—A genus of pretty little rock plants with trailing stems, deeply toothed pinnate leaves, and small flowers. They are quite hardy

in most places, and are increased by seeds, division, and cuttings. The best-known kinds are: *adscendens*, with silvery leaves; *Buchanani*, with heads of reddish flowers; *glauca*, with blue-green foliage; *inermis*, with bronzy stems and light-green leaves; *microphylla*, one of the most popular for covering rockwork, &c.

Acantholimon glumaceum (PRICKLY THRIFT).—A charming rock plant, 3 in. high, having dense masses of pointed leaves and rose-coloured flowers. *A. venustum* is similar, but is about 6 in. high and has more glaucous foliage and larger flower spikes. *A. acerosum* and *A. Kotschyi* are other rather rare species. All kinds like warm sunny positions in sandy peat and loam, and may be increased from seeds, layers, and cuttings in cold frames.

Acanthus (BEAR'S BREECH).—A genus of ornamental Thistle-like plants with large leaves more or less deeply divided and coarsely toothed, and with dense erect spikes of flowers. They like deeply dug rich soil, warm positions, and may be increased by seeds, division, and cuttings of the roots in a close frame. The best kinds are: *candelabrum*, 3 ft., with huge leaves, and purple and white flowers in August and September; *longifolius*, 4 ft., purple and white; *mollis*, 3–4 ft., with large and glossy leaves, and purple and white flowers. The variety *latifolius* (or *lusitanicus*) is larger in every way, and is perhaps the finest of all; *spinosissimus* has deeply divided leaves with sharp white spines; and *spinosus* is a somewhat dwarfer plant also with spiny leaves and purple flowers.

Achillea.—This large genus, containing the Milfoils and Yarrows, has only a few species of commercial value. The best known is *A. Ptarmica*, a white-flowered British species about 2 ft. high, often grown for cut flowers. The double form "flore pleno" and one known as "The Pearl" are most popular. They can be grown almost anywhere, and will produce quantities of cut flowers during the summer season. The best rose-coloured Yarrow is *A. Millefolium roseum*, which grows from 1 to 3 ft. high. It may be grown in fair quantity for cut flowers by the market grower. Other species in which a fair trade is done by nurserymen are: *A. Ageratum*, 6–9 in. high; *A. Clavennæ*, 6–9 in.; *A. Herba-Rota*, 6 in.; *A. macrophylla*, 2 ft.; *A. mongolica*, 1½ ft.; *A. rupestris*, 3 in.; *A. serrata*, 1–2 ft.; *A. alpina*, 2 ft.; and *A. umbellata*, 6 in.—all with white flowers. The best yellow-flowered kinds are: *A. ægyptiaca*, 12–18 in.; *A. Eupatorium*, 4–5 ft.; *A. filipendula*, 4 ft.; *A. tanacetifolia*, 2½ ft.; and *A. tomentosa*, 1 ft. All species are easily increased by division in spring or autumn. *A. argentea*, 6 in., white, forms dense rosettes of silvery leaves.

Aconitum.—The Aconites or Monkshoods are not popular plants with market growers, probably owing to their poisonous properties. Many species, however, are grown by nurserymen for hardy borders and rock gardens, in which they are very ornamental when boldly massed. They are easily raised from seeds or by division of the rootstocks, tuberous or otherwise, in autumn. The following kinds may be noted: *A. Anthora*, 1–2 ft., pale yellow; *A. autumnale*, 3 ft., bluish purple; *A. Napellus*, the common tuberous-rooted Monkshood, 3–4 ft., deep blue; *A. Wilsoni*, 6 ft.,

pale bluish-purple; *A. japonicum*, 2-3 ft., deep blue; *A. Lycoctonum*, yellow; *A. Fischeri*, blue.

Actæa spicata.—This is the British Baneberry or Herb Christopher, having shortish black rootstocks, much-divided leaves, and erect racemes of white flowers in May, afterwards followed by black, red, or white poisonous berries. This plant sells well with nurserymen, but is not a market flower. It is easily grown in moist sandy peat and loam in shady spots, and may be increased by division.

Adonis.—This genus contains several species of ornamental rock and border plants with finely divided fern-like foliage, and mostly with bright-yellow or golden blossoms in such species as *A. amurensis*, 9-12 in., with its double variety flowers in January and February; *A. distorta*, which flowers in April; *A. pyrenaica* (fig. 180), about July; and *A. vernalis*, 1-2 ft. high, which has bright-yellow flowers about 3 in. across, from March to May. *A. autumnalis*—the "Red Morocco" or "Scarlet Adonis"—has scarlet flowers from July to September, and *A. æstivalis* has scarlet flowers in June—both kinds being annuals. The perennial yellow-flowered forms are popular with nurserymen, and are best increased by seeds and division in early spring. They flourish in any good garden soil, but do not like to be too much disturbed.

Æthionema.—A genus of pretty little free-flowering alpines, easily grown in ordinary garden soil, and increased from seeds or cuttings. The kinds mentioned here grow from 6-12 in. high, and flower from April to July, viz.: *coridifolium*, rose pink; *grandiflorum*, deep rose; *Iberidium*, a shrubby spreading species with heads of small white fragrant flowers; *persica*, rose lilac; *pulchellum*, rose purple. There are a few annual species, like *Buxbaumi* and *saxatile*, which are sometimes grown.

Ajuga reptans (BUGLE).—The purple-leaved variety of this common British plant is largely used for carpet-bedding work and for borders. It has heads of deep-blue flowers and is easily increased by division. The variegated form is also valuable for similar purposes.



Fig. 180.—*Adonis pyrenaica*

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Alchemilla alpina (LADY'S MANTLE).—A native plant, 6–9 in. high, with palmate silvery leaves and small greenish-yellow flowers. It grows in ordinary soil and is suitable for rockwork.

Allium.—There are many kinds of ornamental Onion, but they are not largely grown. Amongst the best kinds are: *acuminatum*, rose; *albo-pilosum*, violet; *cabulicum*, whitish; *Ellisi*, rose; *Erdeli*, white with a crimson centre; *karataviense*, white or lilac; *Moly*, yellow; *neapolitanum*, white; *narcissiflorum* (*pedemontanum*), rose purple, drooping; *cæruleum*, sky blue; *Schuberti*, lilac or rose, &c.

Alstrœmeria.—Although these fleshy-rooted plants from Chili and Brazil are becoming



Fig. 181.—*Alstrœmeria aurantiaca*

more widely recognized for their value as border plants and for cut flowers, they are scarcely yet known to the market grower. A good trade in them, however, is done by the nurserymen. Owing to their long, wiry stems, and beautiful orange-yellow or golden blossoms streaked and spotted with red or carmine, the *Alstrœmerias* are worthy of more extensive culture. They should be grown in good well-drained soil on south borders, the rootstocks being buried from 6–9 in. deep as a protection against frost. The best kinds

are: *A. aurantiaca* (or *A. aurea*, fig. 181), deep orange; *A. brasiliensis*; *A. chilensis*; *A. hæmantha*; *A. Ligtu* (a very variable plant); *A. Pelegrina* and its variety *alba*; *A. pulchella* (or *psittacina*); and *A. versicolor* (or *A. peruviana*)—all of which grow from 2–4 ft. high, and flower during the summer months.

Alyssum.—Of the eighty or ninety species in this genus the best known is *A. maritimum* or *Kœnigia maritima*, the Sweet Alyssum of Britain. It forms dense masses of narrow leaves and small white sweet-scented blossoms during the summer months, and is extensively used as a carpeting plant beneath taller subjects. It is largely grown for market, and is sold in pots or shallow boxes, the greatest trade being done during

May and June—the usual bedding-out season. Being an annual, it must be raised from seeds sown in February or March, in a temperature of 60°–70° F., afterwards pricking out or potting up for sale. Other species grown in nurseries are *A. montanum*, 2–4 in. high, with grey-green hairy leaves and yellow flowers; *A. podolicum*, 2 in., white; *A. pyrenaicum*, 3 in., white; and *A. saxatile*, 4–6 in., yellow, with its lemon-yellow variety *citrinum*; *A. plenum* is a double form, *sulphureum* has pale-sulphur flowers, and “Tom Thumb” has silvery tufts, 2–3 in. high, with rich-yellow flowers. These all flourish in good gritty soil, and are easily increased by seeds or division.

Amaranthus.—A fairly good trade is done in spring in seeds, and later on in small plants in pots or boxes. *A. melancolicus* will grow 3 ft. high in rich soil and produces large tail-like masses of small flowers. *A. caudatus* (“Love-lies-bleeding”) grows 2–3 ft. high, and has long tassels of deep-crimson flower spikes. There are several colour varieties including a yellow one; and one called *gibbosus*, in which the little flowers are collected in separate clusters on the drooping spikes. *A. hypochondriacus*—the “Prince’s Feather”—has deep carmine flowers arranged on dense erect spikes, and has leaves with a purple under surface varying to deep purple all over. *A. tricolor* has the leaves tinted with reddish purple or deep carmine from base to middle, the upper half being yellow tipped with green. There are several forms of it. *A. salicifolius* is remarkable for its masses of very narrow, wavy, and twisted leaves of a bronzy green, turning to a bright red at the base with age. *A. sanguineus* has blood-red foliage, and has a dwarf variety—*nanus*—still deeper in colour. *A. speciosus* grows from 3 to 4 ft. high, and has leaves tinged with red and large feathery plumes of deep carmine purple. The variety *aureus* has yellow plumes.

Amaryllis Belladonna (BELLADONNA LILY).—Bulbs of this lovely South African plant are offered for sale every year, and are common enough to find their way on to the costermongers’ barrows in Farringdon Street. The beautiful rosy bell-shaped flowers appear in August and September, after the broad strap-shaped leaves have died down. The best variety is the Kew one, which has many more flowers than the type (fig. 182). There is a new kind called *Parkeri*, with a white-flowered variety.



Fig. 182.—The Kew Belladonna Lily

Anchusa.—Of the thirty or more species in this genus the most popular is *A. italica*, and especially the “Dropmore” variety, which has tall branching trusses of brilliant blue flowers. It is a lovely border

plant, and might also be grown largely for cut bloom. It flourishes in rich and well-drained garden soil, and is best kept true by division rather than from seeds. A newer variety called "Opal" is also excellent.

Androsace.—These are pretty little Alpine plants, 3–6 in. high, closely related to the Primulas, and chiefly valued as rock plants. They like a well-drained soil of sandy loam and peat, and are increased by seeds or cuttings. The best-known kinds are: *A. alpina*, purple rose; *A. carnea*, pink with yellow eye; *A. Chamæjasme*, white to pink; *A. lanuginosa*, pink with yellow eye; *A. pyrenaica*, white, yellow eye; *A. sarmentosa*, rose, yellow eye; but there are many others.

Anemone.—A large and popular genus of hardy herbaceous perennials, mostly grown by nurserymen for border decoration, the chief trade

being done in the "roots". Some species, however, like *A. fulgens* (or *A. hortensis*, fig. 183), are extensively grown in the Scilly Isles, for the production of early cut flowers, as may be judged from the illustration. The scarlet blossoms are picked in the bud or half-open stage in January, and are tied up in bunches, packed in shallow boxes or baskets, and thus sent to the English markets. As a market-garden crop that produces brilliant bloom early in the year, *Anemone fulgens* may be recommended to growers in the mildest parts of Ireland and other places. There are several fine forms—both single and double—now in cultivation, including the



Fig. 183.—*Anemone hortensis*

stellata and *pavonina* forms. They flourish in good and well-drained garden soil, and about 140,000 could be grown on an acre. They are increased by division of the tuberous roots, and may also be raised from seeds. These should be sown as soon as thoroughly ripe, in specially prepared beds of clean and rich gritty soil, or in cold frames, where the seedlings can be attended to easily. The young plants may be transplanted in autumn if large enough, or in spring. Apart from its value as a cut flower for market, a good trade is also done in the tuberous roots, principally in the autumn, when bulbous plants generally are being purchased.

The Poppy Anemone (*A. coronaria*), of which there are also numerous



Photo, Chas. L. Clarke

PICKING ANEMONE FULGENS IN FULL BLOOM IN JANUARY IN THE SCILLY ISLES



varieties, including the magnificent "St. Brigid" strains, requires a much richer soil, and even warmer and more sheltered situations. An enormous trade is done in the English markets in the blossoms imported from the south of France early in the year. Where cold frames are extensively used, it might be well to utilize some of them for the early production of these two kinds of *Anemones*, but competition with blooms from the Riviera must be taken into account.

Other species of *Anemone* in which a trade is done, chiefly in the roots or seeds, are: *A. alba*, 6 in., white; *A. albana*, 6 in., yellowish; *A. alpina*, 1-2 ft., white to purple and yellow; *A. angulosa*, 6-12 in., sky blue; *A. apennina*, 6 in., sky blue, with a white variety; *A. baldensis*, 6 in., white; *A. blanda*, 6 in., deep blue, with several charming varieties; *A. Halleri*, 6 in., purple or deep lilac; *A. Hepatica*, 6 in., blue, with rose and white varieties; *A. japonica*, 2-3 ft., with white and purple varieties, a splendid and popular border plant; *A. narcissiflora*, 1 ft., white to purple; *A. nemorosa*, 6-8 in., white, the British Wood Anemone, with its blue variety *Robinsoniana* or *cærulea* and double-flowered form; *A. palmata*, 6 in., golden yellow; also a white variety; *A. Pulsatilla*, 6-12 in., purplish, hairy, the Pasque Flower, with several varieties; *A. ranunculoides*, 6 in., yellow; *A. rivularis*, 2 ft., white; *A. sylvestris*, 6-18 in., white. Most of these are easily grown, and may be increased from seeds or division.

Antennaria tomentosa.—This distinct-looking composite forms a dense carpet of silvery-white foliage on the ground, and has white flower heads in June and July. It is easily increased by division, and is grown in fairly large quantities for sale. It flourishes in any good garden soil, but must have plenty of sun to develop the best colour.

Anthemis.—The Chamomiles are not of much garden value, and only a small trade is done in them by nurserymen. They grow in any poor soil in border or rockery, but like plenty of sunshine. They are graceful enough with their finely divided thread-like foliage and Marguerite-like blossoms. The best-known kinds are: *A. Aizoon*, 4-6 in., white; *A. Biebersteini*, 1-2 ft., white, its variety *Marschalliana* having yellow flowers; *A. cinerea*, white; *A. macedonica*, 6-9 in., white; and *A. tinctoria*, 18 in., bright yellow, with several improved forms.

Anthericum.—A large genus of Liliaceous perennials, having stoutish, fleshy rootstocks, narrow channelled leaves, and tall spikes of white Lily-like blossoms during the summer months. They are easily increased by division in autumn or from seeds. The trade done is chiefly in the plants for border decoration, and the best-selling kinds are: *A. Liliastrum*, known as St. Bruno's Lily, with its varieties *giganteum* and *major*; *A. Liliago* (St. Bernard's Lily); and *A. ramosum*—all growing from 2-3 ft. high. They are useful for cut flowers.

Antirrhinum.—Such kinds as *asarina*, *glutinosum*, and *sempervirens*, all more or less creeping, about 6 in. high, and with pale-yellow flowers, are excellent little rock plants. See also *Snapdragon*.

Aponogeton distachyon (CAPE PONDWEED or WINTER HAWTHORN).—

An ornamental South African water plant with floating oblong leaves and forked spikes of white sweet-scented flowers in winter. It is propagated by careful division of the tuberous rootstocks in spring, and from seeds.

Aquilegia.—The Columbines are charming border plants, and a good trade is done in the "roots" and also the cut spikes of bloom, especially in the hybrid long-spurred varieties that have been evolved from such species as *chrysantha*, *cærulea*, *glandulosa*, *sibirica*, *Skinneri*, and *vulgaris*. These garden forms have a great range of colour, and the larger the flowers, the longer the "spurs", and the cleaner and clearer the colours the better

chance of selling. Muddy or confused coloured varieties are likely to be a drug in the market.

Aquilegias, or Columbines as many prefer to call them, are easily grown in rich and deeply dug garden soil, from 30,000 to 40,000 plants going to an acre. They are easily raised from seeds sown when ripe or in spring in shallow drills, afterwards pricking out the seedlings when about 3 in. high into lines about 6 in. apart, and transplanting the following year at least 1 ft. apart, although 18 in. will not be too much when it is intended to grow the plants for cut flowers only. Particularly good varieties are best increased by division in early autumn, as they are not likely to come true from seeds. The following species and varieties may be noted: *A. alpina*, 1 ft., deep blue, May; *A. atropurpurea*, 2-3 ft., deep purple, June; *Bertoloni*, 1 ft., blue, June; *A. chrysantha*, 3-4 ft., yellow;



Fig. 184.—*Aquilegia cærulea*

A. cærulea, 1-1½ ft., blue and white (fig. 184); *A. californica* (or *A. formosa*), 2-3 ft., bright orange-red; *A. glandulosa*, 1-2 ft., deep blue, and *Stuarti*, a fine blue-and-white form; *A. sibirica*, 1-2 ft., bright lilac, with an attractive double variety; *A. Skinneri*, 2-3 ft., scarlet, yellow, and orange; and *A. vulgaris*, 1½-3 ft., with blue, purple, or white flowers. There are several double forms in which one or more corollas are placed inside each other.

Arabis albid.—Of late years the double-flowered form of this easily-grown hardy perennial has completely driven the single-flowered variety out of the market. It is an evergreen plant with masses of grey-green bluntly-toothed leaves which form a carpet on the ground, the flower spikes about 6 in. high standing well above them, and appearing early

in the year and continuing more or less throughout the summer months. The blossoms are pure white, double, and last a long time either cut or on the plant. Cultivation is simple. Any garden soil will do, and almost any situation. For market work the plants may be grown about 6 in. apart between fruit trees and semi-shady places, and in spring they are packed about two dozen in shallow boxes, and sold for bedding-out purposes; and again in the autumn for covering beds planted with Tulips, Hyacinths, Daffodils, &c., so that the double white *Arabis* may be regarded as a lucrative crop, requiring the minimum of cost to grow. It is best increased by division almost at any time except in winter, or by cuttings of sturdy shoots from the base. Other kinds are *A. alpina*, 6 in., white; *brevifolia*, with small Aubrietia-like leaves and rose-pink flowers; *A. procurrens*, 6 in., white; and a form with variegated leaves.

Arenaria.—Pretty little rock plants for sandy and stony places, and increased by seeds, cuttings, and division. *A. balearica* is the best for covering stones, with dense masses of small green leaves studded with tiny white flowers. Other kinds are *cæspitosa*, with a golden-leaved form; *gothica*, *grandiflora*, *laricifolia*, *montana*, *norvegica*, *Rosani*, *tetraquetra*, and *verna*—all with white flowers. *A. purpurascens* has purplish blossoms.

Armeria.—The Thrifts or Sea Pinks are excellent, tufted, grassy-looking plants for edgings and rock gardens, and are easily grown in ordinary soil. They are also easily increased in most cases by division in spring or early autumn, and by seeds if necessary. A good trade is done in the common British Thrift, *A. vulgaris* (or *A. maritima*), which has pink or rose-coloured flowers on stems 6–9 in. high. Other kinds worth growing are *A. alpina*, pale and deep rose; *A. bracteata rubra*, bright crimson; *A. cephalotes* (or *latifolia*), rose, with white and red varieties, having flower heads on stems about 18 in. high; *A. juncea*, rosy pink; *A. Laucheana*, bright rose, with a white variety; and *A. plantaginea*, 18 in., bright rose. *A. arborea* is a curious species with thickish woody stems, having tufts of grass-like leaves and reddish flowers.

Arnebia echioides.—An interesting Armenian perennial, 6–12 in. high, remarkable for the fading of the blackish-purple spots that decorate the bright-yellow flowers in early summer. It is a good rock plant and is increased by cuttings in sandy soil. Popularly known as the "Prophet Flower".

Artemisia (WORMWOOD).—The best-known species are the Southernwood, *A. Abrotanum*, a fragrant shrubby plant, 2–4 ft. high, also known as "Lad's Love" and "Old Man". It has divided grey-green leaves, and small yellowish flowers. There is a variety, *Tobolskiana*, larger in all its parts. *A. lactiflora* grows 4–6 ft. high. It is a noble-looking plant with branching sprays of creamy flowers borne well above the grey-green leaves in August and September. It flourishes in any soil and is even excellent as a bog plant. Other good species are *holosericeus* and *lanata*, both with silvery leaves.

Arum.—A small trade is done in the hardy species of Arum, chiefly

amongst those who love curiosities. *A. crinitum*, the Dragon's Mouth, is an extraordinary-looking Corsican plant, 18 in. high, with evil-smelling flowers, having a large hairy spathe and spadix. *A. Dracunculus* is another curiosity, 2-3 ft. high, with deep purple or claret spathes. *A. palestinum* has deep velvety-purple spathes. The common British Arum, *A. maculatum*, known also as "Lords and Ladies" is well known.

Arundo.—There are two species—*A. Donax* and *A. conspicua*—in which a trade is done by hardy-plantsmen. They are ornamental grasses from southern Europe, and produce large feathery plumes or spikes of flowers. Raised from seeds and also by division.

Asclepias currasavica (REDHEAD).—A bushy Central American plant, 1-3 ft. high, having oblong lance-shaped leaves and clusters of curious orange-red or scarlet flowers at the ends of the shoots. Plants are raised from seeds or from cuttings in heat, and are effective when used for bedding out in the summer months.

There are several other species, the best known being *A. tuberosa*, a hardy tuberous-rooted perennial, 1-2 ft. high, having dense clusters of orange-red flowers borne in the axils of the leaves from July to September.

Asperula odorata.—This is the Common or Sweet Woodruff of Britain, with whorls of leaves and sweet-scented white blossoms. It is an excellent carpeting plant for border or shrubbery, and many people are fond of it. Other kinds suitable for rock gardens are *hirta*, *humifusa*, *longiflora*, and *nitida*—all with white flowers; and *suberosa* with white silky leaves and clear pink flowers.

Asphodelus.—There are several species of these graceful plants, with sword-like leaves, grown by nurserymen for border decoration and for cut flowers, the best being *A. ramosus*, 4-5 ft. high, with spikes of white flowers. Other white-flowered Asphodels are *albus*, *comosus*, *fistulosus*, and *sub-alpinus*, all about 2 ft. high. *A. luteus* (or *Asphodeline lutea*) has yellow flowers, and is popularly known as the "King's Spear". All the kinds mentioned flourish in ordinary garden soil, and may be increased by division in spring or autumn. They flower in summer.

Aster (STARWORT or MICHAELMAS DAISY).—The Asters proper are ornamental border plants, many of them being so coarse and vigorous in growth as to need thinning out considerably year after year. A fair trade is done by nurserymen in some of the choicer kinds, while some of the taller and more vigorous varieties are highly valued by florists during the late summer and autumn months. Almost all kinds are easily grown in ordinary garden soil, or even the poorest soil, and may be increased by division. Of late years many charming seedling varieties have been raised by intercrossing different species and varieties. The following is a selection:—

WHITE-FLOWERED: *acuminatus*, 2 ft.; *corymbosus*, 2 ft.; *diffusus*, 2 ft.; *dumosus*, 3 ft.; *ericoides*, 3 ft.; *graminifolius*, 6 in.; *longifolius*, 3 ft.; *macrophyllus*, 2 ft.; *multiflorus*, 3 ft.; *ptarmicoides*, 2 ft.; *Sturi*, 6 in.; *Tradescanti*, 3 ft.; *umbellatus*, 5-6 ft.; *undulatus*, 3 ft.; *vimineus*, 2 ft.; &c.

BLUE-FLOWERED: *acris*, 2 ft.; *cordifolius*, 2 ft.; *linarifolius*, 2 ft.;

Novi Belgii, 3-6 ft.; *paniculatus*, 4 ft.; *patens*, 2 ft.; *peregrinus*, 1 ft.; *puniceus*, 4-6 ft.; *sericeus*, 2 ft.; *spectabilis*, 2 ft.; *Stracheyi*, 6 in.; *subcœruleus*, 1½ ft.; *Townshendi*, 3 ft.

PURPLE-FLOWERED: *alpinus*, 1 ft.; *Amellus*, 2 ft.; *diplostephioides*, 1½ ft.; *lævis*, 2-6 ft.; *Novæ Angliæ*, 4-6 ft.; *sikkimensis*, 3 ft.; *tricephalus*, 1-3 ft.

LILAC-FLOWERED: *amethystinus*, 4 ft.; *Herveyi*, 1-2 ft.; *Lindleyanus*, 2 ft.; *Shorti*, 2-4 ft.; *turbinellus*, 3 ft.

Astilbe.—Graceful border plants with divided leaves and feathery trusses of blossom. The trade is chiefly confined to nurserymen, who sell the plants for borders, &c. The best-known kinds are: *A. chinensis*, 3 ft., pink, with a fine variety called *Davidi*; *A. rivularis*, 3-4 ft., creamy white, from Nepal; and *A. Thunbergi*, 2 ft., rose to pure white, Japan. There are several fine hybrids likely to become good garden plants in time. The Astilbes are all easily grown in ordinary garden soil, but prefer the banks of lakes, streams, &c., like the Spiræas, with which they are often confused. There is a new group called *Arendsii*, the result of crossing *Davidi* with *Hoteia japonica* and *Spiræa astilboides*. There are several forms with large loose heads of clear rose-pink and rich-salmon flowers.

Astrantia major (MASTERWORT).—This distinct-looking plant of the Carrot family grows 1-2 ft. high, and has small white or pink flowers surrounded with an involucre of distinctly veined pinkish bracts in summer. It grows in any soil and may be increased by division or seeds.

Aubrietia (PURPLE ROCK CRESS).—A fairly good trade is done in these plants, which are invaluable for rockeries and borders, to which they give a glow of beautiful purple in spring. They may be increased from seeds, division, or cuttings—the two latter methods being the only way to keep choice varieties pure. The work should be done in early autumn. Any ordinary garden soil will suit so long as it is well drained. The best-known species is *A. deltoidea*, with lilac-purple flowers; but perhaps the best for selling is “Dr. Mules”, a fine form of *purpurea* with vivid purple-violet flowers. Another good form is “Lloyd Edwards”, with large deep-purple flowers. Other kinds are *Campbelli*, *grandiflora*, *Leichtlini*, *Moerheimi*, *Prichard's A1*, *W. Ingram*, *Hendersoni*, *Eyreii*, *Froebeli*, and *violacea*.

Auricula (*Primula Auricula*).—For garden decoration the Alpine Auricula quite outdistances that known as the florist's type, however fascinating these latter may be to specialists. Of freer growth and flowering, embracing a remarkable colour variation, and possessed of the sweetness of their tribe, the Alpine Auricula never lacks admirers. Chiefly of two colours, the centre of the flower being white or yellow, the marginal colour may be of shades of blue, red, purple, or yellow.

CULTURE.—The plants are best raised from seeds which may take weeks or months to germinate; hence a little patience is required, as well as the knowledge of the fact, to save valuable seeds from being discarded. The seedlings, too, are of rather slow growth in the first year or so, and in this respect have much in common with alpine Primulas generally.

Seeds should be sown during the autumn or winter following their ripening. The plants may also be increased by division, an operation best performed after flowering in spring. In undertaking this work it is necessary that the stems be buried to the lower leaves. Good holding loam is what the plants prefer, and with the addition of grit, or old plaster, and some well-decayed manure, the plants ask for little more. Seeds of a good strain always command a high price, and the fact should be borne in mind. Allowing for pathways, about 60,000 plants can be obtained to the acre. [E. H. J.]

Bartonia aurea (or *Mentzelia Lindleyi*).—A Californian hardy or half-hardy annual 1-1½ ft. high, with narrow coarsely toothed leaves and golden-yellow Hypericum-like flowers with numerous long stamens. Another species, *B. decapetala* (or *Mentzelia ornata*), is about 2 ft. high, and has large white flowers.

Bellis perennis.—The typical species is the Common Daisy of British and European pastures, but it has given rise to many fine garden varieties—all with double flowers. They are all easily grown in moist rich soil, and a great trade is done in the plants from March to June every year, and even then the flower heads, especially if long-stalked, will sell fairly well as “cut”. From 70,000 to 80,000 plants can be grown on an acre of ground, and at only ¼d. each that represents a turnover of about £80 per acre. The only cultivation after planting in summer or early autumn is to keep the soil free from weeds, and this is best done by using a small hoe between the plants. Some of the best varieties are *Diana*, red; *Goliath*, rose and white; *La Fiancée*, pure white; *Pink Beauty*, pink; and *Rob Roy*, bright crimson. The “Hen and Chickens” Daisy has a cluster of small flower heads round a larger central one. A variety known as *Ma Paquerette* on the Continent has flower heads 3-4 in. across, and comes fairly true from seeds like many of the other varieties.

Bluebells (*Scilla festalis*).—The Common Bluebell grows freely in any good garden soil, and its spikes of blooms sell during the early summer months. Besides the ordinary bluish-purple form, there are others having pure-white and rose-coloured flowers. For market purposes a fairly large number of bulbs might be planted between rows of fruit trees in the same way as Daffodils, and once planted may be left to look after themselves. Bulbs of the ordinary variety may be obtained for 10s. or so per 1000.

The Spanish Bluebell is *Scilla hispanica* or *campanulata*. It flowers in May, and has fine spikes 12-18 in. high of large bell-shaped flowers. There are blue, white, and rose-coloured forms, but the white one is best for market.

Bocconia (PLUME POPPY).—Two species—*B. cordata* (fig. 185) and *B. microcarpa*, both natives of China and Japan, have become popular plants of late years, and are in every hardy-plantsman's catalogue. They are exceedingly vigorous growers, but the trade in them is strictly confined to the roots, although the stems, leaves, and plumes of whitish blossom are also useful for cutting. The plants grow in any except the worst and sourest

soil, in shade or sunshine, and cannot be suppressed. They are easily increased by pieces of the root in spring, but will also come up like weeds from seed. The leaves are very large, deeply lobed, and very ornamental, with a white under surface, the fleshy fistular stems being often over 1 in. in diameter, and often 10-12 ft. high.



Fig. 185.—*Bocconia cordata*

Bog and Water Plants.—Quite a large number of plants are now stocked by certain nurserymen to meet the demand that has arisen of late years for the furnishing of banks of lakes, ponds, streams, &c., and also for the water itself. Plants that flourish on the margins in marshy spots are known as bog or marsh plants, while those actually growing in the water are called “aquatics”. Every large garden,

private or public, now has a water garden and a bog garden, and wonderful taste is displayed in rendering them beautiful objects in the landscape.

The following genera supply plants that flourish, under conditions mentioned, in the open air, the purely aquatic ones being indicated by an asterisk (*) and the more or less tender ones by a dagger (†).

Acorus.	Iris Pseudacorus.	*†Pontederia crassipes.
Alisma.	Juncus (Rush).	Primulas.
*Aponogeton.	*Jussiaea.	Ranunculus Lingua.
Arundo Donax.	*Limncharis.	Rodgersia.
*†Azolla filiculoides.	Menyanthes.	Sagittaria.
Bambusa, vars.	Myosotis	*†Salvinia natans.
*†Brasenia peltata.	(Forget-me-not).	Sarracenia.
*Butomus.	Myrica Gale.	Saxifraga peltata.
Calla.	Myriophyllum.	Scirpus lacustris.
Caltha palustris.	Narthecium.	Spiraea.
Cyperus.	†Nelumbium, vars.	*Stratiotes aloides.
†Eichhornia.	Nuphar luteum.	Symplocarpus foetidus.
Equisetum, vars.	*†Nymphaea, vars.	†Thalia dealbata.
Eriophorum polystachyum.	Orchids (see p. 76).	*†Trapa natans.
Gunnera.	Orontium.	*†Trianea bogotensis.
†Hedychium.	Osmunda (Royal Fern).	Typha.
*Hottonia.	Parnassia.	*†Vallisneria.
Houttuynia.	Peltandra virginica.	*†Victoria regia.
Iris laevigata.	*†Pistia Stratiotes.	*Villarsia.

Brevoortia Ida Maia.—A beautiful Californian bulbous plant, better known perhaps as *Brodiaea coccinea*. It has drooping umbels of deep-red and bright-green tubular flowers. Best increased by offsets if obtainable. Seeds produce flowering plants in three or four years.

Brodiaea.—A genus containing several species of pretty bulbous plants, mostly North American, and fairly easy to grow. There is a fair trade in the bulbs (or corms) in the autumn, when they are planted in well-drained soil. One of the best-known species is *B. uniflora* (formerly better known under the names of *Milla* and *Triteleia*), which has white flowers. Other kinds are: *californica*, rose purple; *capitata*, lilac or violet, with a white variety; *congesta*, deep violet; *Douglasi*, bright blue; *gracilis*, bright yellow; *grandiflora*, violet blue; *Hendersoni*, salmon yellow striped with purple; *Howell*, porcelain white, striped blue, and its fine variety *lilacina*; *hyacinthina*, purple; *Orcutti*, lilac; *Purdyi*, rose purple; &c.

Bulbocodium vernum.—A pretty Alpine Crocus-like plant of the lily family, having violet or rose-purple funnel-shaped flowers in January, not more than 6 in. above the ground. It is easily grown in good garden soil, and is often planted in grass land. The trade is done in the bulbs (corms) in early autumn.

Bupthalmum.—The two best species are *B. salicifolium* and *B. speciosum* or *cordifolium*, both 3–5 ft. high, with golden-yellow or orange flower heads 3–5 in. across. They grow in any garden soil, and are effective on the banks of lakes, streams, &c. They are easily increased by seeds and division. The trade is chiefly in the roots, but the plants are good for cut bloom.

Calamintha.—This genus has a few good rock plants, the best being *alpina*, 6 in., purple; *glabella*, 3 in., lilac purple; and *grandiflora*, 9 in., purple. They flourish in ordinary soil, and are increased by seeds and division.

Calandrinia speciosa.—This grows 1–1½ ft. high, with spoon-shaped leaves and deep purple-crimson flowers from June to September. It is usually treated as a hardy annual. Other kinds are *C. discolor*, 1 ft., rose red; *C. oppositifolia*, tuberous rooted, with white or bluish flowers; and *C. umbellata*, 6 in. high, with brilliant magenta-crimson flowers.

Calendula officinalis.—This is the common British yellow Marigold—an annual that is capable of looking after itself. The choicer garden varieties, like *Meteor*, *Orange Cockade*, *Orange King*, &c., having splendid heads of rich orange red, are largely grown, the trade consisting in the seeds and young plants in spring.

Callirhoe.—Ornamental Mallow-like plants, easily raised from seeds, but not very well known commercially. The best kinds are *involucrata*, with trailing stems, 6–9 ft. long, and crimson flowers; *digitata*, 2–3 ft. high, purple; *C. Papaver*, bright purple red; *alcæoides*, 2 ft., lilac purple; *lineariloba*, 9 in., crimson and white; and *C. pedata*, cherry red.

Callistephus hortensis (ASTER SINENSIS) (fig. 186). This is the parent

of the florist's China Aster. It is a half-hardy Chinese annual 1-2 ft. high, with rigid roughly hairy stems, ovate toothed leaves, and large beautiful mauve-purple flower heads, 2-4 inches across with a conspicuous yellow centre. There are many varieties, single and semi-double, of various shades, but not one equals in beauty the true species itself. As a market flower it is valuable, and good blooms sell freely during the season. They should be cut with the stems as long as possible and made up in bunches of a dozen. Stood in water for an hour or two after cutting, the flowers travel well and last a long time. The plants are easily raised from seed sown in February or March, the seedlings being pricked out about two dozen in a shallow box to be ready for planting out in May. The plants may also be sold in the same way as the China Aster.

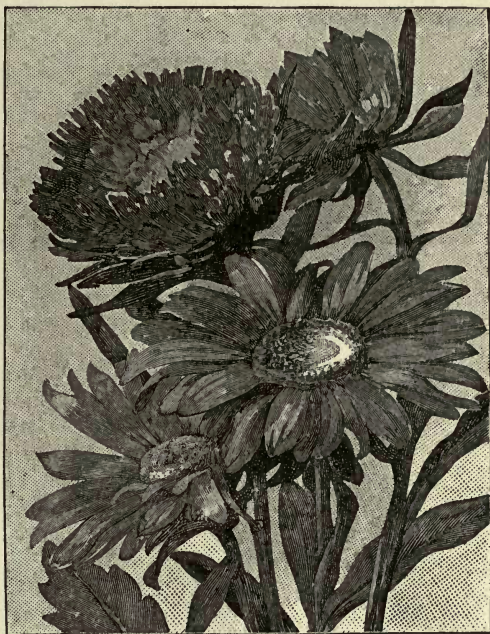


Fig. 186.—*Callistephus hortensis*

Calochortus (MARIPOSA LILY, STAR TULIP).—A genus of pretty bulbous plants from North America, requiring warm sunny places and gritty well-drained soil. There are many kinds, one of the best being *venustus* with yellow hairy flowers stained with crimson and blotched. There are several varieties of it, all beautiful.

Caltha palustris.—This is the common British Marsh Marigold or King-cup, sold for planting by the sides of lakes, streams, &c. It flourishes in rich muddy soil on river banks and streams, and the large bright-yellow Buttercup-like flowers are picked and sold in bunches in spring by costermongers. There are a couple of double-flowered forms.

Campanula.—A very large genus of annuals, biennials, and perennials of varying size and habit. Very little trade is done in the annual species, but a little seed of *C. macrostyla*, *C. drabefolia*, *C. Erinus*, and *C. punctata* is sometimes sold. The first-named is the best, having large cup-shaped purple flowers conspicuously veined with violet.

Besides the above species, nurserymen do a flourishing trade with lovers of rock gardens and flower gardens generally, in many other species and varieties of *Campanula* specially adapted for those purposes. Among the dwarfer growing varieties for rock gardens may be mentioned: *abietina*, 9-15 in., purple red or pale blue, May to July; *Allioni*, 4 in., blue (rarely white); *alpina*, 3-9 in., deep blue; *cæspitosa*, 4-6 in., deep blue (with a

white variety); *carpatica*, 9–12 in., white and lilac; *cenisia*, 3–6 in., blue; *Elatines*, 3 in., trailing, purple; *garganica*, 3–6 in., blue; *muralis* or *Portenschlagiana*, 3 in., pale purple; *pulla*, 3–6 in., violet blue; *pusilla*, 4–6 in., blue; *Raineri*, 3 in., blue; *rotundifolia*, the Harebell, 6–12 in., blue, and white; *turbinata*, 2–3 in., blue, also with a pure white variety; *Waldsteiniana*, 3–6 in., violet blue; *Warleyi*, 6 in., bright purple, with two corollas; *Zoysi*, 3 in., pale blue. These all flower during the summer months, from May to August and September, and in most cases are easily raised from seed, division, or cuttings in spring or autumn.

The following *Campanulas* are grown and sold as general border or rock plants, viz. *allariaefolia*, 1½ ft., white; *glomerata*, 1–2 ft., blue, with a white and a double-flowered variety; *lactiflora*, 2–6 ft., white; *latifolia*, 3–6 ft., blue, and white varieties; *mirabilis*, 1–2 ft., blue; *nobilis* (or *punctata*), 1–2 ft., violet, and whitish; *rapunculoides*, 2–4 ft.; *Rapunculus*, 2–3 ft.; *rhomboidalis*, 1–2 ft.; *Trachelium*, 2–3 ft., all with blue flowers.

In addition, *C. pyramidalis* is a biennial species largely grown for greenhouse decoration. It grows 4–6 ft. high, and has white and blue forms. The seeds are sown one year to produce plants for flowering the next. They realize from 8s. to 10s. per 100 in the young stage.

Candytuft (*Iberis*).—Although there are several species of *Iberis* the one most popular is *I. umbellata*, a pretty South European annual 6–12 in. high, having purple umbels of blossom. There are several varieties, such as *atropurpurea*, deep crimson; *carnea*, flesh; and dwarf forms also of various shades. They are all easily raised from seeds sown in gentle heat in spring, the young plants being sold in clumps or in shallow boxes for bedding out. Other annual Candytufts are *I. violacea*, 3 in. high, purple; *I. coronaria*, pure white, with some fine forms; *I. Bernardiana*, 6 in., pink; and the common British Candytuft (*I. amara*), 6–9 in., white.

Amongst the perennial kinds are *I. correaefolia*—a cross between *sempervirens* and *saxatilis*, 1 ft., evergreen, white; *gibraltarica*, 1–2 ft., evergreen, white, with pinkish shades; *petraea*, 3 in., white; *saxatilis*, 3–6 in., evergreen, white; *sempervirens*, 9–12 in., white, with several varieties, including a double one.

Canterbury Bells (*Campanula Medium*).—Everybody knows and admires the Canterbury Bell, which is an imposing hardy herbaceous biennial of pyramidal habit of growth and profuse flowering. The “cup and saucer” section of these flowers is perhaps the more attractive and is distinguished by the varietal name of *Calycanthemum*. The shades of colour in both sets include white, blue, mauve, pink, &c., and there are also double- and single-flowered varieties, all of which may be raised from seeds sown during the spring months either in frames or in the open. It should be stated that, however carefully the seeds are harvested or grown, a certain percentage will not be true to their kind, whether of single or double varieties.

The plants grow with considerable freedom in any good garden soil, and where cultivated by the acre as a root crop are productive of a good

return. Potted in September or October and gently forced, the Canterbury Bell is useful also a pot market plant for decoration.

The Peach-leaved Campanula (*C. persicifolia*) in blue and white varieties is also useful in much the same way. It is, however, a true perennial, delights in cool spots and moisture-laden soils, and abhors drought.

[E. H. J.]

Carnations, Border.—So called, doubtless, because of their hardiness and amenability to cultivation in the open air. The original wild species (*Dianthus Caryophyllus*), from which all the border types have been evolved by the gardener, is a hardy plant indigenous to this country. It is usually found on old walls and ruins, its root fibres tightly wedged in mortar crevices. From this it may be inferred that the carnation is a lime-loving subject, and the deduction is reasonable and correct. The Perpetual Flowering Carnation is dealt with in the following section.

The border Carnation produces at or near the ground level prostrate evergreen tufts of growth, and in this way differs unmistakably from the "perpetual" types which are usually of a tall habit of growth and produce successional growths or shoots upon their stems.

Within the limits of the border section proper a wide range of classes is found: "selves" of many shades, as crimson, rose, scarlet, white, pink; "fancies", which have a yellow, white, cream, or apricot ground, and petals marked by one or more colour shades or a suffusion of them. The "Picotee", both white and yellow grounds, falls naturally into the border section of these flowers, as do also the "Flakes", "Bizarres", and others of the show class so beloved of old-time florists.

Culturally, and for exhibition work in particular, the whole of these require to be pot-grown, and flowered either in a cold, well-ventilated greenhouse, or, what is almost equally good and a hundred times cheaper, an improvised canvas-screened shed. In such circumstances the flowers expand more gradually, and are more enduring. It is important that the screen be not sufficiently heavy to obscure much light, which would speedily out-characterize the flowers. What is needed is a roof screen alone, to keep off hail, rain, and the great heat of the moment, the sides being quite open. For garden decoration the plants should be massed together in beds or groups of one colour, at all times keeping the high-coloured cerise shades apart from those of pale pink or salmon.

Generally speaking, in the matter of soils the carnation prefers a rather heavy loam, so fibrous and conservative of texture that it is not possible to reduce it readily to dust-like particles. The lightest and sandiest of soils the carnation plant abhors, and, as a fact, it is shortlived in them. The heavier soils should be freely charged with old mortar rubble or burnt lias clay—the latter excellent where procurable. Bone meal at the rate of 6-in. pot to 2 bus. of soil is a good and lasting fertilizer, but should be mixed with the soil some few weeks in advance of being required.

Commercially, the Border Carnation resolves itself into two or three

excellent lines, viz. specializing in high-class strains for the raising of layers, the production of hand-fertilized seeds which are rarely produced in sufficient quantity, and that rougher outdoor method of producing layers by the thousand. For the last purpose we strongly recommend the old *Crimson Clove*, *White Clove*, *Raby Castle*, *Duchess of Fife*, *Gloire de Nancy*, and *Countess of Paris*, while of more recently raised sorts *Daffodil* and *Cecilia*, yellow; *Lady Hermione*, salmon; *Trojan*, white; and *Robert Berkeley* and *Cardinal*, scarlet, will take some beating. Half an acre devoted to these flowers in the six first-named varieties would yield a big return, and in suitable land free of wireworm this crop could hardly be surpassed. Layering would be the heaviest item on the expenditure side, which would, however, be well met by the sale of the flowers. [E. H. J.]

Carnations, Marguerite.—A distinct race of annual carnations easily raised from seed sown in heat in February and March, to flower in the open air in July to August. Seed may also be sown in autumn in cold frames when fully ripe, and after pricking out and being protected in winter may be planted out in May for flowering. About 70 to 80 per cent of the flowers come double, and have white, deep-red, rose, and yellow varieties, the petals being finely toothed on the margins.

Catananche *cerulea*.—A south European perennial, 2–3 ft. high, with whitish narrow leaves, and light-blue flowers in July and August. The variety *alba* or *bicolor* has white flowers marked with blue or rose at the base of the florets. It is easily raised from seeds and by division. *C. lutea* grows about 1 ft. high and has yellow flowers.

Centaurea.—There are some four hundred kinds of *Centaurea*, but very few are grown on a large scale. The best known are *C. Cyanus*, the Cornflower; *C. moschata* or *Amberboa moschata*, the Sweet Sultan; and *C. suaveolens*, the Yellow Sweet Sultan, under which names those plants are dealt with in this work. See pp. 24, 108.

C. Cineraria (better known as *Cineraria maritima*) is a popular market plant useful for bedding-out purposes, the variety *candidissima* being mostly employed. Its beautiful silvery-white and deeply lobed leaves make it particularly attractive. It is almost hardy, and may be raised from seeds sown in spring in gentle heat, or may be increased by cuttings in sandy soil in autumn or spring. Stocky plants are sold in shallow boxes or singly in 3-in. pots, and fetch 1s. to 2s. 6d. per dozen, according to the demand.

C. ragusina is another silvery-leaved *Centaurea* that may be used and propagated in the same way as *C. Cineraria*.

Growers of hardy border flowers stock a few other species of *Centaurea*, such as *dealbata*, 2 ft. high, mauve purple; *eriophora*, 1 ft., yellow; *macrocephala*, 3–5 ft., yellow; *montana*, 3 ft., bright blue; *glastifolia*, 4 ft., golden yellow; and *ruthenica*, 3–4 ft., pale yellow.

Centranthus ruber.—This is the Red Valerian or Pretty Betsy of Britain. It flourishes in chalky soils in plenty of sunshine, and is an effective border plant 2–3 ft. high, its dense clusters of crimson-purple

flowers being also useful for cutting from June to September. There is also a pretty white-flowered variety. Both may be raised from seeds and division.

C. macrosiphon is another species, 2-3 ft. high, with very bright crimson flowers. There is also a white variety and a dwarf dense-growing one called *nana*. They must be raised from seeds as they are annuals.

Cephalaria alpina.—This is an attractive border plant, a kind of Giant Scabious, 5-6 ft. high, producing masses of pale-yellow flowers very useful for cutting. *C. leucantha* is about 4 ft. high, more compact in growth, and has white flowers. Both kinds are easily raised from seeds, or may also be increased by division.

Cerastium tomentosum.—This is the best of several species, valuable for the dense carpeting masses of silvery-white leaves spreading over the ground, and in summer overtopped with delicate sprays of pure-white flowers. A good trade is done in box stuff in spring for carpet bedding, &c. The plant is easily raised by cuttings in autumn or spring. Other *Cerastiums* grown for sale in small quantities are: *alpina*, *purpurascens*, *Biebersteini*, *Boissieri*, *grandiflorum*, and *latifolium*, all with white flowers, and with softly hairy grey-green or silvery leafage.

Ceratostigma plumbaginoides.—This plant is much better known as *Plumbago Larpenæ*. It is a Chinese hardy herbaceous perennial, 1-2 ft. high, remarkable for the beautiful bronzy-yellow and scarlet tints of its oboval leaves and bracts in summer and autumn. It has masses of sky-blue flowers in September and October. It grows in any garden soil, and is increased by division in spring.

Chamælirion carolinianum.—A pretty Liliaceous plant, 1 ft. high, with flattish leaves which turn purple in autumn, and trusses of white flowers in June, the males and females being on different plants. It likes peaty soil in shaded places, and is increased from seeds and by division.

Cheiranthus alpinus (*Erysimum ochroleucum*).—A good plant for the rockery or wall, with lance-shaped leaves and sulphur-yellow flowers. There is a form with variegated leaves. Other kinds are *Marschalli*, bright yellow; *mutabilis*, bronze purple; and *kewensis*, a cross between the Wall-flower (see p. 118) and *mutabilis*. They flourish in good soil, and are raised from seeds, or cuttings only in the case of *Marshalli*.

Chelone Lyoni.—A North American hardy herbaceous perennial, 3-4 ft. high, with oval heart-shaped toothed leaves and quadrangular spikes of purple flowers from July to September. It is increased by seeds, cuttings, or division in spring. Other species are *nemorosa*, 1 ft., rose purple; *glabra*, 3 ft., creamy white; *obliqua*, 3 ft., violet purple. The plant known as *C. barbata* is more correctly known now as *Pentstemon barbatus* (which see).

China Aster.—The florist's China Aster has been evolved during the past eighty years by selection and cultivation from a beautiful Marguerite-like composite—*Callistephus hortensis*—referred to at p. 14. There are

now a very large number of varieties, amongst the most popular being those called "Chrysanthemum-flowered", "Comet" in dwarf (fig. 187) and tall forms, "Ostrich Plume", "Pæony-flowered", "Victoria", and several others. The flowers in some are as regular as in a decorative Dahlia, while in others, notably the Ostrich Plume and Chrysanthemum-flowered sections, the flower heads resemble those of Japanese Chrysanthemums.

As to colour, there is a great range of variation from the purest of whites to the deepest of blues and purples passing through rose, crimson, mauve, pink, salmon pink, lilac, violet, with intermediate shades. Yellow is a rare colour, and is only just beginning to appear, but is a long way from being perfect.

China Asters are treated as half-hardy annuals. The seeds are sown thinly from February to April in shallow boxes in ordinary good rich gritty soil. They germinate in a few days in a temperature of 60° to 65° F. When large enough to handle easily, the seedlings are pricked out 2-3 in. apart in similar boxes and soil, and are hardened off to be ready for the great sales starting in April and finishing in June, for bedding-out purposes. Apart from this trade in the young plants, a good sale is also done with the plants in flower, and also in the cut blooms later on. The plants are placed in rows 6-9 in. apart in the open borders, or



Fig. 187.—Dwarf China Aster

on ground that has already been cleared of Violas, Pansies, Daisies, &c., something like 80,000 plants going to an acre. The soil should be rich and deeply dug or trenched to ensure sweetness; otherwise the Aster disease may attack the plants and cripple them. Where cold frames are available after Violas, Pansies, or other dwarf crops, China Asters may be also planted in them, and will come into flower earlier with the protection of the lights at night. The hoe should be kept going between the plants regularly to keep down the weeds and insect pests, and also to liberate food and conserve the soil moisture—a most important consideration in hot rainless summers.

Chionodoxa (GLORY OF THE SNOW).—Beautiful bulbous plants from Asia Minor, chiefly valuable for spring flowering. A great trade is done in the rather small bulbs (2s. 6d. to 3s. 6d. per 100) in autumn—the best time for planting in borders, shrubberies, or in grass land or lawns. They flourish in any good and well-drained garden soil, and are effective when planted in hundreds and thousands. The best kind is *Lucilia*, with sprays

of sky-blue flowers having a white centre. It has several varieties, such as *nana*, *gigantea*, and *sardensis* (fig. 188), and also a white one.



Fig. 188.—*Chionodoxa sardensis*

Chrysanthemum.—Apart from the florist's varieties of *C. indicum*, which are dealt with in the next section, there are many species largely grown for cut flowers, and also for the roots and seeds. The annual kinds, like *carinatum* or *tricolor*, with its numerous varieties (of which *Burridgeanum* is one of the best), are raised from seeds every spring, sown under glass, the young plants being afterwards pricked out into shallow boxes 2-3 in. apart, or placed singly in 3-in. pots for sale. There are single- and double-flowered varieties, the "singles" having the flower heads symmetrically banded with white, lilac, purple, yellow, maroon, &c.; the "doubles" being generally white or yellow.

The Crown Daisy (*C. coronarium*) is another showy annual species (fig. 189), 2-3 ft. high, with less finely divided leaves than in *C. carinatum*, and bright-yellow, white, or orange flower heads in single and double forms. These are also sold in small pots and boxes (often under the name of "Marguerites" by costermongers), realizing from 6*d.* to 1*s.* 6*d.* per dozen. The British Corn Marigold (*C. segetum*) is another annual 1½ ft. high, with golden-yellow flower heads from June to September. It is easily raised from seeds, and is useful for cut flowers.

Amongst the hardy herbaceous perennials *C. maximum* and its varieties hold the premier place. *C. maximum* itself is a Pyrenean plant 2-3 ft. high, with glossy-green, leathery, toothed leaves, and large white flowers with a yellow centre. It grows in any good garden soil, and likes plenty of sunshine. Plants sell readily as "roots", but the market grower attaches most importance to the flowers. Large quantities are grown for Covent Garden and other markets, and although the prices are sometimes very

low, the plants flower so long and so freely that they yield a very fair return. There are many fine seedling forms in cultivation, some being earlier than others—one of the best early ones being *Mrs. Charles Lothian Bell*. *King Edward VII* and *Robinsoni* are other good forms. They are all easily increased by division in autumn. A grower who is fond of crossing and hybridizing will find *C. maximum* and its varieties a source capable of producing some fine garden plants.

Other species of *Chrysanthemum* more or less popular for cut flowers are *C. serotinum* (or *Pyrethrum uliginosum*), the Great Ox-eye Daisy, about 6 ft. high, that



Fig. 189.—*Chrysanthemum coronarium*

produces its large flower heads from September to November, and sometimes realizes good prices in market. *C. lacustre* and *C. Leucanthemum* (the British Ox-eye Daisy), *C. latifolium*, and *C. nipponicum*, all with white flowers, are worth a place with the market grower. The "Shasta Daisies", so called, are supposed to have originated by crossing forms of *Leucanthemum*, *maximum*, and *nipponicum*, and are also worth growing.

Chrysobactron (Bulbinella) Hookeri.—A pretty little *Asphodelus*-like plant suitable for marshy places or cool moist spots in the border. It has tapering spikes of yellow flowers in summer, and grows about 2 ft. high.

Cimicifuga.—Graceful hardy herbaceous perennials 2-4 ft. high, with divided leaves, and long erect trusses of white and yellowish flowers useful for cutting during the summer months, albeit

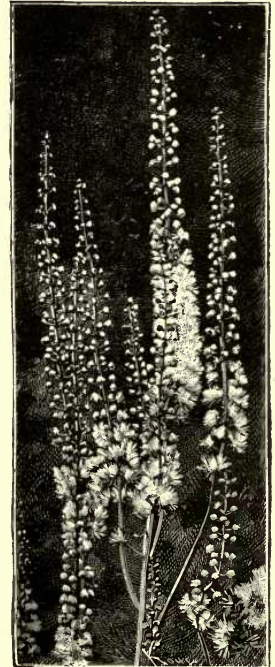


Fig. 190.—*Cimicifuga racemosa*

somewhat strong-smelling. They flourish in any ordinary soil, and are increased by division or from seeds. The best kinds are: *americana*, *cordifolia*, *dahurica*, *japonica*, *racemosa* (fig. 190), *simplex*, and *verticillata*.

Clarkia.—Showy hardy annuals 1-2 ft. high, of easy growth in any garden soil, raised from seeds sown under glass in January and February for early blooms, or in the open in March, to flower from June onwards. *C. elegans*, rich crimson, and *C. pulchella*, rich purple, are both excellent. They sell in pots or shallow boxes in spring.

Cnicus (Chamæpeuce) Cassabonæ.—This is the well-known "Fishbone Thistle" of South Europe. It is an ornamental plant, 2-3 ft. high, with deep green spiny fishbone-like leaves, distinctly veined with white. The flowers are pale purple, but the plants are valued for their ornamental appearance, and are frequently used for bedding purposes. *C. diacantha*, from Syria, is similar, but is easily distinguished by the silvery veins and double ivory-white spines of the leaves. Both kinds are raised from seed sown in gentle heat, the young plants being pricked out in due course, and placed in 3½-in. or 5-in. pots later on for sale, which, however, is limited.

Cobæa scandens.—A beautiful Mexican climber of the Phlox family with pale-green leaflets and tendrils, and bell-shaped purplish flowers. A fairly good trade is done in young plants in spring. These are raised from the flattish, winged seeds sown in January or February, the young plants being afterwards placed in 3½-in. pots with a stake attached. They are chiefly used for climbing over arches, trellises, &c. There is a choice and more tender form having variegated leaves.

Collinsia bicolor.—A fine Californian annual, 1-1½ ft. high, with ovate heart-shaped leaves and white and rose-purple flowers in the type. There are many varieties, including pure-white ones, and some in which the flowers are striped with lilac, rose, or violet. *C. grandiflora* has rose and blue flowers, and *C. verna* white and clear blue. A good trade is done in the seeds of *C. bicolor*, and also in plants in boxes for summer flowering.

Conandron ramondoides.—A pretty Japanese perennial, 6 in. high, resembling *Ramondia* in appearance. It has lilac flowers with a bright-purple centre in summer, and likes a peaty soil. Increased by dividing and pegging down the rhizomes in spring.

Convolvulus tricolor.—This charming South European annual (also known as *C. minor*) grows about 1 ft. high, and produces its lovely funnel-shaped flowers from July to September in such colours as pink, rose, crimson, violet, white, striped, &c.

C. major (also known as *Ipomœa purpurea*), and popular as the "Morning Glory", has twining slender stems and beautiful funnel-shaped flowers of all shades of velvety colours—purple, scarlet, blue, white, &c., being represented.

These annuals are raised in heat from seeds sown in February and March, and are fit for sale in April, May, and June.

Other species of *Convolvulus* grown in small quantities are *C. Cneorum*

(or *argenteus*), a shrubby species 1-3 ft. high, with lance-shaped silvery-haired leaves and pale rosy flowers in summer; almost hardy. *C. mauritanicus*, a trailing North African perennial, with ovate roundish leaves and blue flowers with white centre, is often grown as a hanging plant for pots and baskets and for draping stones in rockeries. It may be raised from seeds, cuttings, and division.

Coreopsis (Calliopsis).—The finest species for market work is *C. grandiflora*, a beautiful North American biennial, $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. high, with erect slender stems and brilliant yellow flower heads. It is an excellent plant for cutting during the summer and autumn. It is best raised from seeds sown each year in April or May, afterwards transplanting the seedlings 1 ft. apart in rows 18 in. asunder to flower the following year. Basal shoots without flower buds may also be detached in August and September, and dibbled in during showery weather. They will root and flower the next year. The best perennial for cutting is *C. lanceolata*, very similar to but not so fine as *C. grandiflora*. Both kinds find a sale for the plants as well as the flowers. Amongst the annual kinds the best are *Drummondii*, *aristosa*, *Atkinsoniana*, and *coronata*, all yellow, the two last-named having a reddish-purple blotch. *C. tinctoria* and its variety *atrosanguinea* are deep blood-red forms.

Cornflower (*Centaurea Cyanus*).—A well-known and charming native annual or biennial, 2-3 ft. high, with narrow downy leaves, and heads of bright-blue flowers in summer and autumn. It is an excellent plant for cut flower, and a trade is also done in the plants in spring. There are several varieties, including *Emperor William*, deep blue, *flore pleno*, double, as well as rose, purple, and white varieties. Seeds may be sown in autumn to produce good plants for sale in spring, and also for early flower. Seeds are also sown in gentle heat in spring, or in shallow drills in the open air.

Corydalis (FUMITORY).—Only a few species are dealt in by growers. The plants are recognized by their grey-green, divided, fern-like leaves and trusses of irregular flowers. Both tuberous- and fibrous-rooted varieties grow almost in any soil, and look well massed. The kinds worth attention are: *bulbosa*, 6 in., purple and white; *capnoides*, 1 ft., sulphur white; *lutea*, 6 in., yellow; *thalictrifolia*, *nobilis*, and *Wilsoni*, all yellow-flowered; and *cheilanthesifolia*, a fine dwarf rock plant, with beautifully dissected leaves.

Cosmos bipinnatus.—This graceful Mexican annual finds a sale in the young stage for bedding-out purposes in early summer. It grows about 3 ft. high, has finely divided leaves, and bright rose, purple, or white flower heads, freely produced in warm seasons. It is easily raised from seeds sown in gentle heat in March, the young plants being hardened off for sale by May in small pots or boxes.

Crocus.—There are many species of *Crocus*, some flowering in spring, some in autumn, but the natural species are only a commercial commodity amongst specialists, botanical gardens, and educational horticultural establishments. Many of them are lovely garden plants worthy of more extended cultivation. In this volume, however, attention need only be paid

to what may be called the Garden Crocuses, the corms of which are sold in hundreds of thousands in the autumn, being mostly imported direct from Holland, where they have been cultivated for generations, if not a few centuries.

The garden Spring Crocus (*C. vernus*) is universally popular. It is grown by the cottager, the owner of the lordly mansion, by public garden authorities, and by market gardeners, so that the bulb merchants do a flourishing trade. The yellow varieties, including the old Dutch Crocus, come from *C. aureus*; and the lilac, violet, and white forms come from *C. vernus*, a native of the Alps, Pyrenees, and Carpathian Mountains. The cost varies from 15s. to 25s. per 1000, according to size, variety, &c., while "mixtures" may be had at cheaper rates.

For outdoor gardening in private gardens and public parks, &c., Crocuses are used in many ways for decoration, either in the grass, beneath flowering trees or shrubs, or as edgings to borders, &c. The market grower, however, is more prosaic, and places the corms in pots, pans, or shallow boxes with the object of selling the plants in various stages of growth. Small shallow boxes about 1 ft. long, 4 in. wide, and 2 to 3 in. deep are popular. The corms are placed side by side, covered with mould up to top of the boxes. These are then covered over with about 6 in. of soil, and are packed away side by side until forcing-time arrives. Some years ago Crocuses were planted in raised beds of good rich soil, and as they were coming into bloom the plants were lifted in little clumps and tied in bundles in moss, and then placed in boxes for market. The modern method is therefore cleaner, easier, less expensive, and the small boxes holding from two to four dozen plants sell well in all stages of growth—either just starting or actually in bloom. Any finely sifted old garden soil does for this purpose, and if early blossom is required the plants may be transferred to a warm greenhouse after root action is well started. It is thus possible to have Crocuses in bloom from Christmas onwards until the first of the outdoor crops begin to bloom.

Amongst the deep-blue, porcelain, and purple Crocuses the following varieties may be recommended: *Albion* and *King of the Blues*, deep blue; *Baron von Brunow*, *Dandy*, *Prince Albert*, *Sir John Franklin*, *David Rizzio*, *John Bright*, and *purpurea grandiflora*, deep purple; *Lord Palmerston*, purple; *L'Unique*, reddish violet; *Margot*, porcelain blue; *Motley*, purple; *Othello*, blackish purple; *President Grant*, lilac; *President Lincoln*, purple violet; *Von Moltke*, dark violet, striped.

Amongst the white spring Crocuses are these: *Caroline Chisholm*, *Grandeur Triomphante*, *King of the Whites*, *Lady Stanhope*, *Mont Blanc*, *Queen Victoria*, *White Queen* (*Reine Blanche*), *La Majestueuse*, *Albion*, *Madonna Mina*, *Sir Walter Scott*, and *Alfred Tennyson*—the last five having violet stripes.

Among the yellow Crocuses the dwarf *Cloth of Gold* (*C. Susianus*) and the *Large Yellow* or *Mammoth* are the best.

Amongst natural species worth growing in large quantities are *sativus*,

the Saffron Crocus, purple lilac with violet veins; *speciosus*, bright blue autumn; *zonatus*, autumn, rose lilac with an orange throat; *C. Imperati* lilac purple, veined outside; *C. biflorus*, known as the "Scotch" or "Cloth of Silver" Crocus, with many varieties with colours from snowy white to rosy lilac, pale purple, mauve, &c. *C. pulchellus* is a lovely autumn-flowering Crocus with bright-lilac flowers having a yellow eye slightly striped.

Cyclamen (SOWBREAD).—The Persian Cyclamen is dealt with in the next section. The hardy kinds have become popular of late years for rock gardens, cold greenhouses, &c. They are easily grown in shady or chalky loam, and are raised from seeds and by division of the tubers. Of the many kinds known these are among the best: *africanum*; *Atkinsi*, with several varieties; *cilicicum*; *Coum*; *europæum*; *ibericum*; *neapolitanum* (*hederaefolium*); *repandum*; &c. The twisted flowers are mostly purple in colour, but there are several white forms, and with few exceptions the roundish leaves are beautifully marbled and veined.

Dactylis glomerata variegata.—This popular grass, with silvery striped leaves, is largely used for borders and beds in which plants with darker-coloured foliage are used. Easily propagated by division in autumn or spring.

Daffodils, Forcing and Open-air.—To the commercial gardener of to-day, whether he devotes his energies to land or glass, the Daffodil has become an indispensable part of his stock-in-trade, a crop he cannot well afford to be without. It is in the very nature of things and by reason of its many sections and endless varieties a successional flowering plant, capable of affording a supply of flowers for weeks on end provided the right selection be grown; and the grower who rightly appreciates this side of the subject is the one who can show the heaviest margin of profit. Indeed a chief difficulty which besets a beginner is that of selecting suitable varieties, and large sums of money have been dropped in the past, and, doubtless, in the future will go the same way, because growers have endeavoured to suit their own fancy rather than consult the public taste. To-day the market florist who desires to make both ends meet, and to put a little aside for a rainy day into the bargain, should never ignore the fact that the leading flower markets throughout the British Isles are great educational centres, a reflex, as it were, of public opinion—and often good taste—well and unmistakably expressed through the medium of the florist decorator, and his daily requirements or purchases. It is for the market florist to cater for such requirements; in other words, to grow the thing that sells. A flower market like Covent Garden, for example, is a great leveller of things, putting on no side, though capable of great things inside. The fact that a certain variety of Daffodil costs so many guineas per bulb is of but little account if the commission agent finds the public will have none of it; hence, in such matters, it is no use kicking against the pricks.

HOW TO FORCE THE DAFFODIL.—In the forcing department a matter of primary consideration is catching the early markets, since a few days—one had almost written hours—might mean a difference of pounds in the



ERICA HYEMALIS AS GROWN FOR MARKET



CYCLAMENS AT AN EXHIBITION

total returns of the crop. To ensure catching the early markets an early start must be made, growing in conjunction therewith only those kinds which experience has proved to be amenable to hard forcing. An equally important factor in the case is that of securing hard, well-ripened bulbs, since grossly grown, flabby, manure-gorged bulbs are the least calculated to bear the strain, or in the end to produce characteristic, well-balanced, or good-coloured flowers. The bulb, therefore, that is as hard as the proverbial stone, and of moderate size according to its kind, is the one that roots best and responds most promptly to artificial heat.

By an "early start" the months of August and September are meant, and all bulbs intended for early forcing should be planted within these limits. Where the bulbs are being supplied from a distance everything should be in readiness, and the work begun promptly on receipt of the bulbs.

BOXES OR POTS.—In the choice of receptacles there is no room for a second thought, the boxes proving to be a veritable *multum in parvo* in the case, the more so where they at all approach a uniform size throughout. In this direction the herring or bloater box finds considerable favour—it is of convenient size and depth, and easily moved about. Such a box would hold of the variety *poeticus ornatus* about 8 dozen bulbs, of *Golden Spur* or *Emperor* about 4 dozen bulbs, and of a moderate-sized bulb—like that of the Tenby Daffodil (*Narcissus obvallaris*)—about 6 dozen bulbs. Where such boxes are not available others of a convenient size may be had to order, those of 16 in. by 12 in. by 4 in., all inside measurements, being found to answer well. The value of these light-made boxes, despite the fact that with heat and moisture they quickly decay, is that they are great economizers of space, and by their use it is possible to get 100,000 or 150,000 bulbs, dependent on the variety, into a house 100 ft. in length.

PLANTING.—This is a simple matter of considerable importance. Charge the boxes quite two-thirds their depth with soil, but avoid firming the soil to any considerable extent. Nearly all daffodils of the trumpet section send their root fibres down almost perpendicularly, and issuing spontaneously from the bulb will often prise themselves out if the soil be made too firm. By first making the soil moderately firm, then pressing the bulbs into it and firmly covering in, they are usually kept in position. Arrange the bulbs almost touching in the boxes, and so place them that the "nose" or apex is just below the level of the box. After placing in the surface soil make it quite firm by ramming.

THE PREPARATORY STAGE.—When planting is completed place the boxes on a level bed of ashes and give a thorough soaking of water, repeating the operation till the soil is completely saturated with moisture. Daffodils of the class one has in mind delight in root moisture, and at this stage there should be no lack of it. Finally, twenty-four hours later, the boxes may be covered with fine coal ash to a depth of 6 in., an essential in the case to prevent lifting. Under this covering the bulbs will be safe for the coming six or eight weeks, requiring no attention meanwhile.

INTRODUCTION TO GREENHOUSE.—Planted within the already prescribed limits the varieties may be introduced to the greenhouse in the following order: *Major* (French grown), first week of November; *Ard Righ*, *Golden Spur*, *Obrallaris*, *Henry Irving*; and double daffs (*N. telamonius plenus*), second to third week of November; *Princeps*, end of November; *Victoria*, *Horsfieldi*, *Empress*, mid-December and later; *Ornatus*, at the end of the year; with *Emperor* and *Sir Watkin* among others, a little later on. A point to remember in this connection is that an early-flowering variety in the open is not necessarily early—or even proportionately so—when grown under glass. Soils and localities, however, exercise such an influence that the writer is precluded from entering into minute details through lack of space, but having laid the foundation the intelligent operator will find it easy to raise up the superstructure.

GENERAL TREATMENT INDOORS.—At this stage a few negatives may be helpful. Here they are. Don't be in a hurry. Don't think you can force a daffodil against its will. Don't burn so many tons of coke or coal without occasion, for, paradoxical as it may seem, undue heat too early applied exercises a retarding influence on the crop, and a much later introduced batch of the same variety, more rationally treated, will precede the first in its flowering. Fourteen days coldhouse treatment for all early kinds is essential, and the time may be extended advantageously. Watch the crop and its progress under these conditions and apply heat gradually with caution and intelligence. Until growth is well in sight and the flower scape is clear of the orifice of the bulb's neck a temperature of 45° F. will suffice; but when these critical stages are successfully passed a considerable rise in temperature may be given.

Avoid the close proximity of hot-water pipes; the arid conditions experienced are opposed to growth. Avoid root dryness at all costs; Daffodils revel in moisture, and in the forcing house it can hardly be overdone. Atmospheric moisture in conjunction with root-applied moisture conduces to free growth and long, characteristic stems—the latter a valued asset in the forced Daffodil.

BUNCHING AND MARKETING.—This is the "last lap", so to speak, in the race, and not a few fail to grasp its importance. To grow a crop for weeks on end, to expend a few pounds in fuel, and finally to put the flowers on the market in a poor condition is the height of folly. Yet it is often done. The more common errors are half-expanded flowers, short stems—much stem being cut to waste in the packing shed—and limp flowers insufficiently supplied with water. A grower of forced daffodils should remember to-day that as much is paid for the stem as for the flower at its summit, short-stemmed flowers being practically valueless. Hence, preserve all possible stem growth. Bunched the day before being marketed, and spending a whole night and day in water, the bunches "face up" well, and, all else being equal, represent the first-class article, while others not so treated may come out but a very poor second.

Fill the boxes well when packing up. Flowers loosely packed and

having room to move about may be in a sorry plight on reaching the market, where first impressions count for much. Firm packing is of the greatest importance when the flowers are sent by rail, the risk of damage being greatly reduced when the goods are sent by road van. The flowers are arranged one dozen in each bunch, and if given room will be seen to advantage. The flowers should always be backed by their own foliage, that is to say, *ornatus* foliage should not be used for *Emperor*, or vice versa. The frail stems of *ornatus* and the smooth rounded stems of double



Fig. 191.—Showing Daffodils bunched and packed in Light and Shallow Wooden Boxes for Covent Garden Market

incomparabilis sorts are the most difficult to arrange, and require patience and not a little engineering at times (fig. 191).

OPEN-AIR CULTIVATION.—This presents no greater difficulty than that of growing a crop of potatoes, and both may be muddled at and not grown. A fair depth of well-worked, moderately rich soil, frequent changes of site where possible, the land preferably manured for a previous crop, annual lifting, and replanting in August and September are among the chief points to be remembered. Where the biennial lifting of second-sized bulbs is contemplated, a thinner planting should be indulged in. Where the land is manured at planting time the manure should be buried at least 6 in. below the bulb-planting level. For light land I consider cow manure, because of its cool nature and moisture-retaining attributes, the best to use, though in this I am not very fastidious. Mulching with manure I regard as waste of time and material; moreover, the manure is presently in the way of the hoe, which should be kept in constant use during the spring months.

FLOWER GATHERING should be done in the bud state, the flowers to be opened in water under glass. This is of far-reaching importance equally when the crop is grown in smoky districts or near dusty highways, the latter sending clouds of dust far away into the fields by reason of the disturbing influence of the ubiquitous motor car. The bunching of these outdoor-grown crops only differs from these earlier ones in not being usually backed by foliage. Accompanied by foliage a slightly increased price may be realized, though this depends not a little on supply and demand, the

consensus of opinion being that it does not pay when the markets are glutted with the flowers.

VARIETIES TO GROW.—(Indoors): *Major*, *Ard Righ*, *Obvallaris*, *Golden Spur*, *Henry Irving*, *Princeps*, *Horsfieldi*, *Empress*, *Victoria*, *Ornatus*, *Emperor*, *Sir Watkin*, *Barri conspicuus*, with *Almira*, *Dante*, *Cassandra*, *Horace*, and *Herrick* of the newer *poeticus* race to follow. Of double-flowered varieties *Von Sion*, (or *N. telamonius plenus*) and *Orange Phoenix* and *Sulphur Phoenix* of the *incomparabilis* set.

For outdoor work the double *Von Sion* is not of much use though all others given above may be grown in quantity. In addition one might name *Frank Miles*, *Beauty*, *Gloria Mundi*, *Madame Plomp*, *Madame de Graaf*, *Albatross*, *Seagull*, *Duchess of Westminster*, and *Mrs. Langtry*. *Excelsior* is an improved *Golden Spur*, and later in flowering. *Monarch* is an improved *Emperor*. Too-much-alike varieties, as *P. R. Barr* to *Emperor*, *Horsfieldi* to *Empress*, are things to avoid. In certain instances *Victoria*, *Empress*, and *Horsfieldi* may all be grown, while generally the two first-named will meet every requirement in the earlier *Ajax* bicolors. *Grandis*, a late-flowering bicolor, might be grown for this reason alone, though not so extensively as the others. Selection and succession are the great points to aim at, and with these marketable flowers, flowers of distinction and merit. In short the Daffodil is still a profitable thing to grow, and the plant of which you can sell both top and bottom—bulb and flower—could hardly be otherwise. See “*Narcissus*”, p. 73. [E. H. J.]

Dahlia.—The cultivation of this plant for profit is necessarily quite apart from the ordinary routine growing. The various cultivators can be divided into three sections: the raisers of new varieties, the wholesale growers, and the retail nurserymen. These sections are fairly distinct, though a few combine all three to a certain extent. Then we have the men who grow only to supply our large public markets such as Covent Garden; these growers usually cultivate for cut flowers in the autumn months. It will therefore be seen that the Dahlia forms no mean subject from a commercial point of view. The business of raising new varieties is practically confined to a few men, who devote much care, time, and land with this object in view, and, needless to add, it must show a fair amount of profit, even if they only raise six or eight new varieties annually, for good prices are obtained for them. At the same time, this section of profitable culture would not commend itself to the bulk of growers.

WHOLESALE AND RETAIL GROWERS.—This section of cultivators is an ever-increasing one, and likely to be so while the interest in the Dahlia continues to grow. Few people realize the tens of thousands of young plants that are raised and sold annually in the spring months. To be successful, the grower must have plenty of land on which to grow his stock, also a large amount of glass, both houses and frames. He must also make large purchases of new varieties, and above all keep his stock true to name, for any grower sending out wrongly-named stock would inevitably fail to hold his customers. As in so many things, to be suc-

cessful in this branch of the business it must be carried out on a large scale, so that young plants can be turned out in their thousands during April, May, and June. To secure this end a start must be made in December, so that the stock house can be filled ready for the first week in the year. Benches on either side of an ordinary greenhouse are best for placing the stools, for they are then near the light, and it enables the cultivator to take the cuttings expeditiously without much stooping. Almost any soil will do for covering the bare benches on which the old tubers are placed in proper order and in divisions, each variety kept distinctly clear of its neighbour and with label securely attached. In covering the tubers with soil each crown or base of the old stem should be well out of it. If a temperature of 55° F. is maintained it will be quite sufficient during the early part of the year, but should be increased as the daylight grows.

PROPAGATION.—The Dahlia will root well provided it gets plenty of bottom heat and not too much top heat. Where plenty of pipes, say three rows of 4 in., are placed under beds 4 ft. wide, this will give all the heat required. As it is essential to keep the top cool, only sufficient heat is wanted to keep out the frost and damp. Some growers plunge their pots in ashes or fibre, but as this adds to the labour bill, and is not necessary, it is more generally dispensed with, and the pots are simply stood shoulder to shoulder on the beds.

COMPOST.—Elaborate composts are not required, and one that is open and free will root and grow the young plants well. Old potting soil, with the addition of spent mushroom bed makes a good mixture. Some growers root their cuttings in "stores", either in boxes or pots, to economize room; but rooting singly in thumb pots is certainly preferable, because it does away with the second handling, an important item in most places. The cuttings can be taken when they are 3-4 in. high, and in the same way as in the case of Fuchsias or Heliotropes. Do not take them with a heel, or the basal eyes will be destroyed. Cuttings should be inserted as expeditiously as possible, to avoid their flagging, from which they always take a long time to recover. As soon as they emit roots they should be moved into another house and placed on beds of ashes, as close to the light as possible. Finally, they can be sorted into the different sections to which they belong and put into alphabetical order; where large collections are kept this takes up an enormous amount of frame room, but it is absolutely necessary to enable one to execute orders quickly and correctly, for nowadays most orders are sent to purchaser's selection, and in these hustling times every buyer is in a hurry.

PACKING AND DISPATCHING.—The plants are generally dispatched in their pots, so that they are ready for immediate sale by the retailer, but occasionally, when sent long distances and to avoid cost of carriage, they are sent out of pots and each one papered up. In this case only well-rooted plants should be sent, or during transit the soil will drop off and so cause delay to the buyer, who has then to re-establish them before

he can sell. Early in the season large numbers can be sent by parcel post with the roots packed in *darap* moss.

POT ROOTS.—These are obtained from plants that are grown in their pots all the season, by the end of which they have formed plump little tubers and are sold during the autumn and winter. These are the only type that can be used for export purposes, when distance and time are factors, and can be sent to any part of the world. They are also largely used for propagating purposes in this country.

SOIL FOR DAHLIAS.—For planting out it may safely be said that Dahlias will grow in almost any soil. For choice a deep loam, rather heavy, suits them best, but they will flourish in any well-cultivated soil. The better the preparation by cultivation the better will be the results; though acres are grown under plough culture, autumn digging is undoubtedly best for heavy soils, while those that are light should be worked in early spring.

MANURING.—If a good dressing of manure be applied when the land is dug, it is all that is necessary, though a dressing of superphosphate or bone compound certainly helps to produce better flowers. This is usually applied at planting-time, just a small handful scattered round the hole; it is then mixed in during the actual planting. Liquid manure during the summer months would be helpful but it would not pay commercially.

PLANTING AND STAKING.—Where pot roots or division of the old stools are relied upon for the stock they should be planted out in April, but it is not advisable to plant out young green plants until the first week in June, except in sheltered places or in the South. It is advisable, where the plants require staking, to drive the stakes before putting in the plant. The strong-growing types, such as Cactus, Show and Fancy, Pæony-flowered, and Giant Decorative should have one central stake and four outer stakes; this leaves room for vigorous growth. This will apply also to many of the tall-growing single, Pompon, and Decorative varieties. The outer stakes can be put in as the plant requires them. This staking is all-important where large flowers are required, for where a single stake only is employed the plants have to be tied in like a faggot, which effectually prevents half the growth maturing sufficiently to flower. Where the plants are only required for stock purposes it is not necessary to go to the expense of stakes; they can be planted more thickly and simply cover the ground. The grower must check each plant while in flower, to see that all the stock is true to name. All the strong-growing varieties should be allowed at least 4 ft. between and in the rows. The Pompons, single, and other shorter types can be grown at 3 ft. apart each way.

THINNING.—Where fine flowers are required the number of growths must be regulated. This is best done in their early stages, allowing each plant five or six growths, while for ordinary purposes double the number will not be too many. The Pompons, Singles and Collarettes, should be allowed to grow naturally, thinning or disbudding being avoided altogether.

DAHLIAS FOR CUT FLOWERS.—It cannot be said that the Dahlia occupies a prominent position in our markets as cut flowers, though there are types that are valuable for decorative work; the modern cactus varieties, with their long narrow petals, are useless, for general work, as they are much too soft and tender to pack or travel well. The older types, such as *Glare of the Garden*, *Cochineal*, *Constance*, &c., are still largely grown for cut-flower purposes because they are broader in the petal, and harder altogether, and still hold their own over the newly created soft and delicate types. Some of the decorative varieties of newer origin will no doubt supplant the older forms when they are better known.

MARKET VARIETIES.—The following are suitable varieties for market work, as they are free-flowering, with good stems and plenty of substance in the petals. No doubt the list might be largely increased, but these are good typical subjects for the purpose.

Kaiserin A. Victoria, white; *Delice*, rose pink; *Jeanne Charmet*, lilac pink; *Papa Charmet*, crimson; *Constance*, white shaded pink; *Henry Patrick*, white; *Glare of the Garden*, crimson scarlet; *Electric*, yellow tipped white; *Ideal*, bronzy yellow; *Dainty*, yellow overlaid pink; *A. D. Stoop*, rich crimson; *Fred Grinstead*, yellow, speckled red; *Pink Pearl*, rosy pink; *Amos Perry*, rich scarlet; *Jeannette*, red yellow; *Countess of Lonsdale*, salmon; *Exquisite*, apricot; *Mary Service*, heliotrope shaded yellow; *Thos. Parker*, orange; *Britannia*, soft salmon; *Mme van der Dael*, rosy pink; *Grand Duc Alexis*, white tipped heliotrope; *Souv. de G. Douzon*, orange red; *Yellow Colosse*, bright yellow.

Any of the show and fancy and Pompon varieties afford good subjects for market work.

PRICES.—The prices for plants naturally vary. They are sold in Covent Garden as low as 1s. per box of fifteen, plants all named, and mostly purchased by the barrow men. As a general rule, stock true to name is worth 12s. to 20s. per 100 wholesale, while more modern varieties will make 20s. to 30s. per 100. The cut flowers are bunched in dozens, in most cases for a cheap market trade. They are also packed in boxes containing a gross of flowers. They are greatly in demand for harvest festivals.

INSECT PESTS.—While the plants are still young they are often troubled with greenfly, which should be eradicated at once, or deformed foliage soon presents itself and spoils the sale of the plants. They are sometimes attacked with thrips and even Red Spider; the last-named occurs through keeping too dry an atmosphere, and can be avoided. In the ground the plants are troubled with Aphis in dry weather, and if the stock be valuable the plants should be sprayed. The Frog-hopper or Spittle-fly is often a plague in the summer months, causing the plants to lose their tops. They are best caught during the evening, when they are not quite so wary as during the daytime. Earwigs are sure to be a pest in a dry season, and should be caught by any of the numerous devices adapted for the purpose.

LIFTING AND STORING.—As soon as the frost cuts the foliage down in the late autumn it is advisable to go over the quarters and cut off the stems about 6 in. from the surface. The old top can then be placed over the stool as a protection from further frost. The tubers are best left in the ground for at least a week afterwards, to allow the sap to settle down in the buds and crown.

Before lifting, the labels should be wired on the stems carefully. The tubers can be stored in any place where they are protected from the frost, and where the wind can blow through them and so dry them, for to store them away in a sodden condition means courting failure. They must be well dried off before winter. After this they have very little rest as a general rule, for by the second week in December they should be ready for another year's work.

EXHAUSTED STOCK.—It will often be found that a variety will "run out", as it is termed. In the case of fancy varieties they revert to a whole colour, while many of the double and cactus forms appear semi-double. This can always be corrected by buying in a new stock from a totally different soil, when not only will the flowers come true again but they will produce better stock for the following year. [J. B. R.]

Delphinium (LARKSPUR).—For market purposes there is nothing to beat the fine hybrid forms that are now so well known, and have been raised from crossing and intercrossing such species as *elatum*, *elegans*, *formosum*, and *grandiflorum*. They grow from 4-6 ft. and more high, have finely cut ornamental foliage, and long erect spikes of flowers varying from pale Cambridge blue to the deepest of Oxford shades, with intermediate shades of purple, &c. The plants are valuable because the "roots" sell well in spring, and the cut spikes of flowers of unsold



Fig. 192.—*Delphinium nudicaule*

plants sell freely later on in summer. Seeds are sown in shallow drills in April and May, and the young plants are afterwards transplanted 18-24 in. apart in rich and deeply dug and well-manured soil—that is if the finest

clumps are to be secured. They may be grown almost in any place in the open, or between rows of fruit trees not too closely planted. Specially fine varieties are easily increased by dividing the rootstocks into as many pieces as possible not later than September or October. The hoe should be used occasionally between the rows to keep the weeds down.

Besides the hybrid Larkspurs, some natural species also sell, such as *cardinale*, 2-3 ft., scarlet; *cashmerianum*, 1½ ft., pale blue; *grandiflorum*, 1-1½ ft., rich blue; *nudicaule*, 1½ ft., bright red (fig. 192); and *Zalil* (or *sulphureum*), 4 ft., sulphur yellow. Two annual Larkspurs—*D. Ajacis*, white, pink, or blue; and *D. consolida*, blue, violet, purple, &c.—are also raised from seeds and sold in boxes in spring.

Dianthus.—This genus includes several valuable garden plants, notably the Carnations, Cloves, and Pinks (*D. Caryophyllus*), the Sweet William (*D. barbatus*), and a large number of valuable alpine species suitable for the rock garden. One of the best-known kinds is *D. chinensis* (fig. 193), the Indian or Chinese Pink. It is a biennial, 6-12 in. high, with red flowers. There are, however, many forms of it, both single and double, of which the following are the best: *albus*, white; *carneus*, flesh pink; *fulgens*, scarlet crimson; *Crimson Belle*, deep red; *Eastern Queen*, deep rose; *laciniatus*, with jagged petals and single and double forms; *Heddeweggi*, a fine variety, with single and double forms of various colours; *imperialis*, a taller variety, with double flowers that are useful for cutting. A trade is done in the seeds and young plants in spring, the cultural treatment of the latter being the same as for half-hardy annuals like the China Aster, Zinnia, &c.



Fig. 193.—*Dianthus chinensis*

Amongst the kinds suitable for rock and alpine gardening, and in which a trade is largely done in pot plants, the following dwarf tufted ones are grown in larger or smaller quantities by specialists: *acaulis*, bright pink; *alpestris*, bright rose; *alpinus*, deep rose; *arenarius*, white with crimson spot at the base; *cæsius*, rose, the "Cheddar Pink"; *callizonus*, rich rose purple; *carthusianorum*, bright rose; *deltoides*, bright red, the "Maiden Pink", of which there is a white variety; *dentosus*, violet rose;

fragrans, white, tinged purple, with a double variety having creamy white flowers; *Freynei*, rose lilac, very dwarf and tufted; *frigidus*, pale purple; *glacialis*, purple; *Holtzeri*, pink; *integer*, pure white; *Knappi*, clear yellow; *monspessulanus*, red or white; *neglectus*, carmine (fig. 194); *petræus*, rose, with a very double form; *ramosissimus*, purple rose; *Seguieri*, rose purple; *Simsi*, pink; *sub-acaulis*, pink; *superbus*, pink and white; *sylvestris*, rose pink; and *zonatus*, bright rose, dark centre. Most of the above form dwarf tufted masses, and are chiefly appreciated by the owners of large gardens where there is scope for the establishment of rock and alpine gardens.



Fig. 194.—*Dianthus neglectus*

Dicentra (*Dielytra*) *spectabilis*.—This is the well-known Chinese Lyre Flower, Bleeding Heart, Lady's Locket, or Dutchman's Breeches, grown so much in pots for early bloom in conservatories, and in the open and for border decoration in summer. The thickish masses of roots are imported in autumn, placed in 5-in. or 6-in. pots with a little gritty soil worked in around them. They are then stood outside and covered with soil or ashes

about 6 in. deep, where they remain till wanted. From Christmas onwards they are brought into a warm greenhouse and forced into bloom for market. They sell well owing to their gracefully cut foliage, and their arching racemes of bright rosy pink drooping blossoms, to which the name of "Solomon's Tears" has also been given, as well as the others mentioned above. Other species sold by nurserymen are *canadensis*, white; *chrysantha*, yellow; *cucullaria*, white and yellow; *eximia*, reddish purple; *formosa*, red; and *thalictri-folia*, yellow and red.

Dictamnus Fraxinella.—This—the Fraxinella, Dittany, or Burning Bush—is a pretty bushy plant 2-3 ft. high, having serrated leaflets and trusses of pale lilac-rose blossoms distinctly feathered and veined with purple. The white-flowered variety—*alba*—is



Fig. 195.—*Dictamnus Fraxinella*

very pretty. The plants flourish in ordinary good garden soil, and may be increased by root cuttings inserted in gentle heat in spring; by careful division of the rootstocks in autumn or spring; and by seeds, which, however, germinate slowly and erratically. The trade in this plant is confined to nurserymen, the prices varying from 6*d.* to 1*s.* each according to size and variety. As a pot plant it ought to sell fairly well in market, as many people would like it for experimenting with at nighttime. If a lighted match is applied on a dark night the volatile oil that is secreted from the stems and leaves will readily catch light, and justify the name of "Burning Bush" (fig. 195).

Dimorphotheca aurantiaca.—This is a fine showy composite annual from South Africa. It grows 1–1½ ft. high, and produces its rich golden-orange Marguerite-like flower heads, 2½–3 in. across, with a purplish-black centre, in great profusion during the summer months. The seeds should be sown in February and March in gentle heat, afterwards pricking the seedlings out and hardening off for the open air by May. This species has just begun to find its way to market, and is likely to become popular. There are several other species, amongst the best being *D. Ecklonis*, with pure-white Marguerite-like flower heads, tinged with soft mauve purple outside. *D. pluvisialis* is somewhat similar, but unfortunately the flower heads close in dull weather, or early in the afternoon even in sunny weather.

Dodecatheon Meadia.—A handsome North American hardy herbaceous perennial, known as "Shooting Stars" and "American Cowslips", grows about 1 ft. high, and has tufts of oblong-obovate leaves and umbels of rosy purple or lilac Cyclamen-like flowers on top of an erect stalk. There are several forms, such as *Clevelandi*, rich violet blue; *Hendersoni*, bright crimson with a yellow base; *integrifolium*, rose crimson; *Jeffreyanum*, purple rose; and *patulum*, yellow. They are all increased from seeds sown in spring, and by division. The trade is small.

Doronicum (LEOPARD'S BANE).—Hardy border perennials of great vigour, freedom of flowering, and general utility. Valuable alike in the cut state for pot or market work, or for spring flower gardening on a large scale. The leading kinds are: *D. austriacum*, *D. caucasicum*, and *D. plantagineum excelsum* (syn. *Harpur Crewe*). The flower heads are yellow in each case, Marguerite-like in appearance, and very showy. Moreover, they are among the earliest of spring-flowering plants, providing sheaves of blossoms in March and April in the open. The two first-named are of rather dwarf habit of growth, 1½ or 2 ft. high, the last-named reaching to 3 ft. high and having the most handsome flowers. It is, however, less freely flowered than the others named.

Propagation is effected in springtime by division, preferably immediately after flowering, when the plants, if divided piecemeal and replanted in good ground, will make excellent examples for another year. The Doronicums are among those plants of which both the tops and the bottoms may be sold; hence for these reasons, as also their decorative value, they are among the most profitable things to grow. The plants

succeed quite well in ordinarily well-cultivated soil, and are not averse to moisture. Much shade, however, is inimical to their wellbeing. For market pot work the plants should be lifted and potted in September, and accorded cold-frame treatment. [E. H. J.]

Dracocephalum.—These handsome border plants, known as "Dragon's Heads", flourish in any ordinary soil in semi-shaded situations. They flower from May to August and sell in the autumn or spring, but the trade is restricted. The best kinds are *baikalensis*, 1-1½ ft., blue; *grandiflorum* (or *altaianse*), 1 ft., blue; *imberbe*, 6 in., lilac blue; *Ruprechtii*, 1 ft., light blue or rose purple; *Ruyschianum*, 1-1½ ft., purple blue, and its variety *japonicum*, violet blue, spotted; *peregrinum*, 1 ft., blue, nearly always in flower, prostrate in habit; *speciosum*, 1½ ft., purple blue, spotted with lilac; *virginianum*, 5 ft., lilac purple, with a lovely white form *alba grandiflora*; *imbricata*, 3-6 ft., pinkish purple, spotted. The last two kinds are often known as *Physostegia*. All are increased by division in early autumn or spring, and by seeds.



Fig. 196.—*Echinacea* (*Rudbeckia*) *purpurea*

Echinacea (*Rudbeckia*) *purpurea* (fig. 196).—A fine North American hardy herbaceous perennial about 3-4 ft. high, with ovate lance-shaped leaves, and deep rose-purple flower heads about 4 in. across in late summer. This plant may be increased by division of the short thickish rhizomes in spring or in autumn after flowering.

Echinops Ritro.—This is the common "Globe Thistle", 3-5 ft. high, with coarse prickly thistle-like leaves, and roundish steely-blue flower heads in summer. Other species are *banaticus* (or *ruthenicus*), *humilis*, and *sphaerocephalus*, the latter having silvery leaves and whitish flower heads. They are all increased by division, and from seeds sown in spring in the open or under glass. The trade is restricted to nurserymen, and is not very large.

Elymus arenarius (LYME GRASS).—An ornamental grass, 3-6 ft. high, useful for planting in beds or borders or intermixed with other plants of a bushier and bolder nature. Easily increased by division or from seeds. There are several other species, but they are scarcely known. Good clumps sell from 3d. to 6d. each, but the trade is very limited.

Eomecon chionantha.—A handsome Chinese perennial with thickish roots, pale-green roundish leaves, and pure-white flowers in summer with a cluster of orange stamens in the centre. A somewhat tender plant, requiring warm sunny positions and protection in winter. Increased by division in spring.

Epilobium (WILLOW HERB).—Of the fifty species known, *E. angustifolium* is probably the best. It grows 36 ft. high, has willow-like leaves and spikes of crimson flowers; but there is also a very attractive white-

flowered variety. *E. hirsutum*, known as "Codlins and Cream", has pale pink flowers; also a white form. *E. Dodonæi* grows about 1 ft. high, and has rose-purple flowers; and *E. rosmarinifolium*, like a Rosemary bush, about 1 ft. high, has carmine blossoms.

Epimedium.—Graceful dwarf perennials with ornamental bristly leaves often highly coloured with rose, brown, or purple. They grow in moist peat and loam, and are useful for the rock garden or border. Propagation is effected by division and seeds, and plants sell at anything from 3d. to 6d. each. The best kinds are *alpinum*, *diphyllum*, *macranthum* or *grandiflorum*, *Musschianum*, *pinnatum*, *purpureum*, *rubrum* *Perralderianum*—all of which grow about 1 ft. high in dense masses.

Eranthis hyemalis (WINTER ACONITE).—The irregular tuberous roots of this sell freely in autumn with the usual bulbous plants. It is valuable for planting thickly in borders, shrubberies, rockeries, and beneath deciduous early-flowering trees and shrubs with Crocuses, Scillas, Chionodoxas, Snowdrops, &c., to produce its bright-yellow blossoms from January to March. *E. cilicica* is similar but larger in flower, and *E. sibirica* is the last to bloom. They all flourish in ordinary garden soil.

Eremurus.—Magnificent herbaceous perennials with thick fleshy roots, long sword-like leaves, and immense spikes of starry flowers often towering 8 or 10 ft. above the soil. They like a well-drained loamy soil in warm sheltered spots or in thin shrubberies. The rootstocks sell fairly well, but it is necessary to make the plants better known. One of the best-selling kinds is *E. robustus*, with pale-pink or rosy flowers, and its fine variety *Elwesianus*, with flesh-coloured flowers. Other excellent kinds are *Bungei*, 1-3 ft., bright yellow; *aurantiacus*, 3 ft., pale yellow; *himalaicus*, 3-10 ft., white; *Olgae*, 2-8 ft., lilac white; *wurei*, coppery yellow; and *turkestanicus*, 4-8 ft., red with white edges. They are all natives of Afghanistan, Persia, Turkestan, &c. They may be propagated by careful division in early spring, and also by seeds. The seedlings reach the flowering stage about the third year. There are several fine hybrid forms.

Erigeron (Stenactis) speciosus.—This is the most-showy and best selling member of a large genus. It grows in any good garden soil, and loves the sun. It produces masses of soft-violet or magenta-purple Marguerite-like flowers with a bright yellow centre, and is valuable for cutting for market. The variety *superbus* is the best form. The simplest way to increase the stock is by division in autumn. Other species, with a restricted sale, are: *aurantiacus*, 1 ft., bright orange; *compositus*, 3 in., blue; *glabellus*, 1½ ft., lilac; *glaucus*, 1 ft., lavender blue; *Howelli*, 1 ft., lilac; *mucronatus*, 6 in., white tinged pink; *neo-mexicanus*, 1½ ft., white; *philadelphicus*, 1½ ft., flesh pink; *pulchellus*, 1 ft., rosy lilac; *Roylei*, 6 in., deep lilac purple; *salsuginosus*, 6 in., lilac. They are nearly all natives of North America except *E. aurantiacus*, which comes from Turkestan.

Erodium Manescavi.—This is a fine rock-garden plant, 1-2 ft high, with deeply penetrating roots, divided leaves, and masses of showy Geranium-like flowers rich purple crimson in colour. *E. macradenium* (or

glandulosum) is only about 6 in. high, and has pale-violet or flesh-coloured flowers veined with crimson purple, the two upper petals having a dark blotch at the base. There are several other species very little known. They thrive in warm well-drained soil, and dislike cold damp spots. They are best increased by seeds sown when ripe, or by cuttings or division of the tufts with pieces of root. Trade limited.

Eryngium amethystinum.—This is a fine European Sea Holly, 2-3 ft. high, having spiny lobed leaves, and bright-blue or amethyst-purple flowers



Fig. 197.—*Eryngium pandanifolium*

and bracts. Closely related is *E. Oliverianum*, a taller plant with amethyst-blue flower heads. Other less-attractive species are *alpinum*, 3 ft., pale blue; *Bourgati*, 1 ft., small, blue; *giganteum*, 3-4 ft., glistening white (should be treated as a biennial); *maritimum*, 1-2 ft., the common British Sea Holly with grey-green leaves and bracts; and *planum*, small blue. Such species as *agavæfolium*, *bromeliæfolium*, *eburneum*, and *pandanæfolium* (fig. 197) have long strap-shaped spiny leaves in rosettes, with the flower heads standing well above them. All species are easily raised from seeds, but the plants may vary a good deal in colour. Root cuttings and careful division may be practised in spring for

particularly fine varieties to keep them true. In a cut state the plants last a long time, and are used as "everlastings".

Erythronium.—A fine genus of bulbous plants, all natives of North America, except the well-known European species, *E. Dens-canis*, the Dog's Tooth Violet. They flourish in well-drained sandy soil, but in partially shaded and sheltered spots. The flowers, more or less drooping on long stalks, stand well above the leaves, which in many species are beautifully marbled with bronzy green and white. The chief trade is done in the bulbs in autumn, but some species are still very rare. The following kinds are in cultivation: *E. albidum*, white; *americanum*, golden yellow, tinted with purple; *californicum*, creamy white; *citrinum*, lemon yellow; *Dens-canis*, rose purple; *giganteum*, pure white; *grandiflorum*, bright golden yellow; *Hartwegi*, creamy white to yellow; *Hendersoni*, rose purple; *Howelli*, pale yellow; *Johnsoni*, rose pink; *mesochoreum*, white; *montanum*, cream to pure white; *Nuttallianum*, golden yellow; *propullans*,

rose purple; *purpurascens*, pale yellow tinted purple; and *revolutum*, pink to deep purple, with several varieties. They all flower between February and May, and are excellent for pot culture in cold greenhouses. Propagation, chiefly by offsets from the older bulbs, may be practised after the foliage has died down each year.

Eschscholtzia californica (CALIFORNIAN POPPY).—A free-flowering and popular Californian annual with grey-green finely divided leaves and bright orange-yellow flowers. There are now many charming and much-improved varieties, such as Carter's *Carmine King*, with beautiful carmine-rose-coloured flowers; *Mandarin*, orange crimson; *Rose Cardinal*, delicate bright rose; *Golden West*, almost entirely orange; and others. The ordinary form is little better than a weed, but the other varieties make charming border flowers, and are easily raised from seeds sown about the middle of March and thinned out about 1 ft. apart.

Eucomis.—Large bulbous-rooted plants from South Africa, almost hardy, and best grown in south borders at the base of a warm wall in rich well-drained soil. They have large bulbs, strap-shaped rosettes of leaves mottled beneath, and fleshy spikes of starry flowers. They are best increased by offsets. The following kinds are known: *bicolor*, greenish yellow; *guttata*, 3 ft., greenish white and purple; *punctata*, 3–4 ft., similar; and *regia*, 2–3 ft., white—all blooming in late summer and autumn.

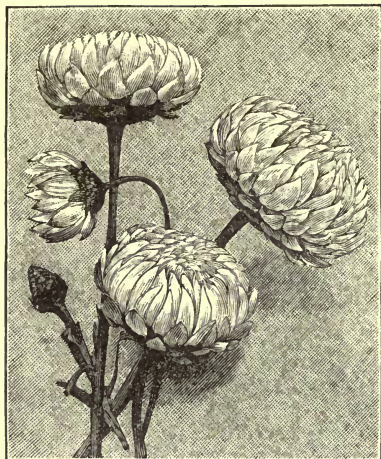
Eupatorium ageratoides.—This is a fine hardy plant about 4 ft. high, with dense feathery masses of white Ageratum-like flowers in August and September. It grows freely in any soil, and may be increased by division or seeds.

The following species are best grown in a greenhouse, and may be propagated from cuttings inserted in sandy soil in spring: *atrorubens*, reddish purple; *probum*, white; *riparium*, white, red stems; *trapezoideum* (or *adenophorum*), white, tall-growing.

Euphorbia.—There are several species of hardy Spurgeworts, all easily grown in ordinary soil, and increased from seeds or division. The best selling kinds are *capitata*, 6 in., yellow; *Cyparissias*, the Cypress Spurge, 1–2 ft., with narrow leaves and dense masses of yellowish-green roundish bracts (commonly called flowers); *epithymoides*, 1 ft., golden yellow; *Lathyris*, 3 ft., the Caper Spurge, greenish-yellow; *Myrsinites*, 9 in. golden-yellow; and *Wulfeni*, a fine plant with dense heads of greenish-yellow cup-like bracts.

Everlasting Flowers.—This name has been given several plants the flowers of which retain their colour and shape for several months in a dried state. Amongst the best "Everlastings" are the following:—

Helichrysum monstrosum, a South African plant 2–3 ft. high, having double flower heads of golden yellow, crimson, white, rose, sulphur yellow, violet, and orange red, &c., which are freely produced in open sunny situations or under glass. *H. arenarium*, 6–12 in. high, has golden-yellow flowers; and *H. bracteatum*, a beautiful Australian annual, 3–4 ft. high, has flower heads varying from pure white to rose, light and pale yellow.

Fig. 198.—*Acroclinium roseum*

in the British Islands. About 5000 acres, each with about 24,000 plants, are devoted to the industry in the South of France.

Fig. 199.—*Helipterum (Rhodanthe) Manglesi*

H. incurvum is a splendid plant, 2–3 ft. high, having Wallflower-like leaves and brilliant heads of flower 2–3 in. across, orange and yellow inside and deep crimson outside. It should be grown in bold masses for flowering in August and September.

The “Immortelles” so largely used for wreaths, crosses, &c., by florists, are the dried flowers of *H. orientale*. These are imported to the extent of several thousands of pounds worth annually, and are to be had not only in the natural yellow colour, but bleached to white, and dyed blue, red, green, purple, &c. The plant is a native of Crete, and much too tender for open-air cultivation

Helipterum roseum (or *Acroclinium roseum*) (fig. 198) is another Australian annual, 1–2 ft. high, having rosy flowers, with a white variety. *H. Humboldtianum*, (or *Sandfordi*), 1–1½ ft. high, is a woolly, white Australian annual with bright-yellow flowers which change to a metallic green when dried; and *H. Manglesi* (fig. 199), still better known by the name of *Rhodanthe*, is a popular Australian Everlasting, 1–1½ ft. high, having ovate-oblong leaves, and soft rose-pink flower heads with a yellow centre. *Xeranthemum annuum* (or *radiatum*) is a South European Everlasting, about 2 ft. high, with woolly, white stems and leaves, and flowers varying in colour from white to purple and violet, in single and double forms.

Ammobium alatum is another hoary-looking Australian Everlasting,

1½–2 ft. high, having silvery-white flowers with yellow centres, the variety *grandiflorum* being particularly fine.

The species mentioned above are all easily raised from seeds sown in pots or shallow boxes in gentle heat in March, the young plants being afterwards pricked out in boxes, or three or four being placed in a 5-in. pot and grown on for sale in May and June. The stems, being fragile in most cases, require a thin twig to hold them up, with a piece of black cotton, &c., tied round.

Forget-me-not (*Myosotis*).—This pretty-flowered and popular genus embraces hardy plants, several species of which are natives of Britain, including the Wood Forget-me-not (*M. sylvatica*) and the Marsh Forget-me-not (*M. palustris*). For present purposes, however, two outstanding types merit notice: those suited for pot culture and those best adapted for bedding. Of the first named, *Star of Love*, *Bouquet*, *Gem*, and *Perfection* are the best, and of the latter, *dissitiflora* and *Royal Blue*. The former set embraces rose, white, and blue; the latter, light and dark shades.

The chief value of Forget-me-nots lies in growing them in pots for market work or as cut flowers. In each case, if early produced, they find a ready sale. *Royal Blue*, and *dissitiflora* in blue and white, are invaluable for cutting or for bedding out, and are worth growing in quantity.

Their cultivation is very simple. Sow seeds in May or June and transplant the seedlings early to cool, partially shaded quarters, finally potting those desired. The plants may be readily increased by cuttings or by division, the latter operation being best done in early spring when the flowering is past. As an acre of Forget-me-nots will yield about 80,000 plants at 6 in. apart, or, allowing for footpaths, about 65,000, they may be looked upon as a fairly remunerative crop. Five thousand dozen plants at 6d. per dozen would yield a gross return of £125, thus allowing enough for the grower who is fortunate enough to obtain a good and ready sale.

Foxglove (*Digitalis purpurea*).—Next to the Wallflower or Sweet William the Foxglove is still worthy of attention by the commercial gardener, and those who specialize in root crops more particularly. The plant must be regarded and treated as a biennial, as indeed it is; hence the seeds should be sown in the spring of each year and flowered the following summer. The plant is of the easiest cultivation, growing freely in any good garden soil, and not opposed to those of chalk or sand. In cool and shady places also it thrives quite well.

Sow the seeds in the open in March or April, the former for preference, covering the seeds very lightly. Transplant the seedlings during showery weather when large enough to handle. Early transplanting should be practised, as upon the making of a large rosette of leaves in the season of planting a good flowering afterwards depends. Late sown or late vegetating seeds may not flower the year following the sowing, hence the desirability of starting early. Put out the seedlings into their permanent quarters when large enough. There is a considerable range of colour

through white, cream, primrose, rose, and red; the strains known as "giant" and "gloxinia" flowered being the best. [E. H. J.]

Francoa (MAIDEN'S WREATH).—Almost hardy plants with roughish leaves and long arching sprays of blossom. They are often grown in pots, and are easily raised from seeds sown in warmth in spring. The two species known, *appendiculata* and *ramosa*, both with white flowers, are natives of Chili.

Fritillaria (FRITILLARY).—Of the many species of Fritillary known, the Crown Imperial (*F. imperialis*) seems to be the only one grown at all extensively for market purposes. It is often grown in market gardens between rows of fruit trees and bushes, and as it requires no attention, once planted, it comes in as a useful catch crop in early summer. The large bulbs emit a terrible stench, but the plants are nevertheless ornamental in appearance, and especially when bearing the large drooping bell-shaped flowers near the summit of the tall, fleshy stems clothed with glossy, green wavy leaves. Besides the ordinary yellow-flowered species there are many varieties with different shades of orange and orange-red colours. Any good and fairly moist and gritty garden soils suit the Crown Imperial, and it lasts longer in partially shaded spots. The flowers, with stems as long as possible, are sold in bunches in market, sometimes realizing fair prices. There are several other kinds of *Fritillaria* large and small, in which a trade is done by hardy plantsmen.

Funkia (PLANTAIN LILY).—These ornamental foliage plants with thickish rootstocks flourish in any good garden soil, and are easily increased by dividing the roots in autumn or spring, and also by seeds sown in spring. There is a fairly good trade done in the plants in spring at very varying prices. The following are amongst the best kinds: *Fortunei*, 1½ ft., broad leaves, flowers pale lilac, the variety *variegata* having the leaves striped with white; *glauca*, 1 ft., leaves grey-green, flowers deep lilac; *grandiflora* (or *subcordata*), 1½ ft., leaves ovate, flowers pure white; *lanceifolia*, 1 ft., leaves lance-shaped, flowers white; the variety *albo-marginata* has leaves with creamy-white edges, and *undulata* has very wavy leaves, one form of it having streaks and blotches of white; *ovata*, 1½ ft., leaves ovate, grey green, flowers deep purple, a fine plant; the variety *striata* (or *medio-picta*) has yellow stripes, and *marginata* has white-margined leaves; *Sieboldiana*, 2 ft., the noblest of all, with fine large whitish-green leaves, and lilac and white flowers.

Gaillardia (FLANNEL FLOWER).—Showy even to gorgeousness in some instances, *Gaillardia grandiflora* (fig. 200) is a plant to be cultivated by all who take up hardy flowering subjects from the commercial point of view. Resplendent in crimson and gold and orange, the flowers of these plants are self-advertising and appeal to a large number by reason of their attractiveness. Valuable to the amateur in garden or flower bed, and alike valuable to the market florist in the cut state—selling like hot cakes in provincial and country markets—these are the things to grow where an honest penny has to be turned.

The best method of cultivation is to raise seedlings each year, planting out an acre, or what you will, in moderately good soil, so soon as large enough. By sowing seeds in February, and subsequently potting the seedlings singly in small pots, the young plants will be ready for garden or field by the middle or end of May, where, good growth ensuing, they will be capable of an abundant flowering the following summer.

The flowering in these plants is very profuse, and it is this fact which renders their cultivation profitable. It is a "cut and come again" crop for weeks on end, and, despite low prices, quantity must tell. The great secret of success, however, is in the early start we have indicated. To sow the seeds in July and August means small weakly plants incapable of flowering, and practically the loss of a whole year. *G. g. maxima* is one of the handsomest of named varieties.

[E. H. J.]

Galanthus (SNOWDROP). — The bulbs and flowers of the Snowdrop are both good market commodities. In autumn the trade consists in selling thousands of bulbs, and in early spring thousands of bunches of the common single and double Snowdrop (*G. nivalis*) find their way to the markets, and then to the street sellers and florists' shops. The choicer kinds of Snowdrops, such as *Alleni*, *cilicicus* (fig. 201), *Elwesi*, *Ikarica*, *globosus*, *latifolius*, and *plicatus*, sell chiefly in bulbs in autumn. They have larger blooms than the com-



Fig. 200.—*Gaillardia* (3)



Fig. 201.—*Galanthus cilicicus*

mon Snowdrop, but they are yet very numerous. All the kinds may be grown in well-drained garden soil in borders, rock gardens, between rows of fruit trees, &c., according to circumstances and the objects in view.

Galax aphylla.—This charming North American hardy herbaceous perennial has found its way into the markets and florists' shops, and even among street sellers of late years. It grows about 6 in. high, and produces fine masses of large roundish green leaves which become beautifully bronzed or crimsoned in autumn, and are, therefore, valuable as a backing for cut flowers of a lighter colour. The plants flourish in peaty soil, or in a garden soil well enriched with decayed manure, and, being easily grown and lasting for years, may be regarded as a fairly lucrative if not extensive crop.

Galega officinalis (GOATS' RUE).—A fine strong-growing European perennial, 3-5 ft., with graceful pinnate leaves, and spikes of pale-blue Pea-like blossoms borne in great profusion in summer. The white variety *alba* is even more charming, and sells better. There is also an attractive blue-and-white variety called *bicolor*. There is another kind, *orientalis*, from the Caucasus, with bluish-purple flowers. The plants grow in any garden soil, and are useful for cutting. They are readily increased by division or from seeds, each established plant requiring about 1 sq. yd.

Galtonia (Hyacinthus) candicans.—This noble South African bulbous plant has long, sword-like leaves, and tall erect racemes of drooping white bell-shaped flowers in summer. It flourishes in good and well-drained garden soil, but is only really hardy in the most-favoured spots. It is better to lift the bulbs in late autumn and store till spring. At this season bulb merchants sell a large number. The flower spikes are good for cutting, but they are not likely to be grown extensively for market work. The same may be said of *G. princeps*, which is very similar, but the white flowers have a tinge of green in them.

Gazania splendens.—A pretty garden plant supposed to be a hybrid between the orange *G. rigens* and the yellow *G. uniflora*, both natives of South Africa. It grows about 1½ ft. high, and has narrow spoon-shaped leaves remarkable for the white under surface. The bright orange-yellow flower heads, with a black and white spot at the base of each ray floret, sometimes find their way to the market and sell readily. The plants should be grown in a warm, sunny situation, in well-drained gritty soil. They are best propagated by cuttings in July and August in cold frames, and protected during the winter months in the same way as the shrubby *Calceolarias*.

Gentiana.—Owing to the difficulty that is generally experienced in cultivating the Gentians, they are found only in few gardens, where a delight is taken in overcoming cultural obstacles. The trade in the plant is naturally very restricted, but the brilliant blue of the flowers will always induce a few to invest. The best blue kinds are *acaulis* (fig. 202) and *verna*, each about 3 in. high, with masses of blue bell-shaped flowers overtopping the leaves. They are most likely to succeed in well-drained

gritty soil composed of loam, peat, and sand in cool moist positions in the rock garden. Such kinds as *asclepiadea*, 1½ ft.; *cruciata*, 9 in.; *Pneumonanthe*, 9 in.; and *septemfida*, 1 ft., all with blue flowers, are fairly



Fig. 202.—*Gentiana acaulis*

easy to grow; while *G. lutea*, 3 ft., with yellow flowers, is the most vigorous of all.

Geranium (CRANE'S BILL).—The geranium proper must not be confused with the florist's Geranium, which is more correctly known as the "Zonal" Pelargonium (which see). The Geraniums are mostly hardy herbaceous perennials, with divided leaves, and bluish or purple flowers. They flourish in any garden soil, and may be increased by seeds or division. The trade in them is restricted to nurserymen. The best kinds are: *armenum*, 2 ft., bright purple; *Endressi*, 1 ft., pale rose purple; *ibericum*, 2 ft., violet blue; *pratense*, 2-3 ft., blue and violet, with a fine double form; *Robertianum*, 1 ft., the "Herb Robert", bright crimson; *macrorrhizon*, 1 ft., bright purple; *sanguineum*, 1-2 ft., crimson, or blood red, with a variety *lancastriense*, having pink purple-veined flowers; *grandiflorum*, 9 in., a lovely Himalayan plant, with violet purple flowers; *Grevilleanum*, 3 ft., pale violet, very fine; and *anemonæfolium* or *Lowi*, 2 ft., rose purple, with large leaves that assume beautiful green, gold, and reddish tints in autumn.

Gerbera Jamesoni.—An ornamental South African perennial, hardy only in the milder parts, but worthy of cool greenhouse culture. It has rosettes of lobed rather coarse leaves, and brilliant orange-scarlet Marguerite-like flower heads, 3-4 in. across, on tall stems. There are now a large number of beautiful hybrid forms between this species and *G. viridiflora*, with orange, scarlet, soft-pink, creamy-yellow, and intermediate shades of colour. If these were grown in quantity they would very likely realize good prices. At present the chief trade is in the plants and seeds. In the open air the plants should be grown in very warm, sheltered, and sunny spots in a compost of loam and peat and well-rotted manure.

Geum.—Pretty rosaceous plants easily grown in any garden soil. They

may be raised from seeds, but the choicer kinds are best propagated by division in autumn. The trade is chiefly in the plants in autumn and spring. The following kinds are best: *chiloense*, 1-3 ft., scarlet, with better forms, known as *grandiflorum*, *miniaturum*, &c., and a double one *flore pleno*; *coccineum*, 6-12 in., scarlet, with a variety *Heldreichi*, having a deeper orange-red tint; *montanum*, 6-12 in., yellow, with a few forms; *rivale*, 9 in., purple. Perhaps for cut flowers for market work it would be difficult to beat a semi-double variety of *G. chiloense* named "Mrs. J. G. Bradshaw", which has blooms $2\frac{1}{2}$ in. or more across, of a brilliant scarlet crimson, and borne on stalks about 2 ft. high; a splendid plant also for massing in beds or borders.

Gilia tricolor.—A popular Californian annual, 1-2 ft. high, with divided fern-like leaves and tubular flowers of orange, deep and pale purple. There are several varieties, all easily raised in gentle heat, or as hardy annuals. *Nivalis* is a pure-white kind with an orange eye; *achilleæfolia*, purple blue; *capitata*, blue; and *coronopifolia* (or *Ipomopsis elegans*), scarlet, best treated as a biennial, are amongst the best-known kinds in which a trade is done every spring in seeds and young plants.

Gillenia trifoliata.—A graceful Spiræa-like herbaceous perennial from North America. It grows 1-2 ft. high, has slender dark-red stems, three-parted leaves, and loose clusters of white and reddish flowers in June and July. *G. stipulacea* is somewhat similar, but has loose-shaped deeply cut leaves and white flowers. Both kinds flourish in ordinary garden soil, and like semi-shady spots. They may be increased by division.

Gladiolus.—There are many species of gladiolus, but not one has yet attained sufficient importance to become a market plant. Excluding the European *byzantinus* and *communis*, they are mostly natives of Southern Africa. From the florist's point of view the hybrid Gladioli, such as *brenchleyensis*, *Colvillei*, *Childsi*, *gandavensis* (fig. 203), *Lemoinei* (fig. 204), *nanceianus* (fig. 205), and *nanus*, are the most valuable; and a great trade is done in the corms or solid bulbs in spring and autumn, and in the flowers in spring and late summer and autumn. For market work *G. Colvillei*, rose and white, and its variety "The Bride", with pure white flowers, sell well in spring, the spikes being largely used by florists for decorations. The bulbs are placed in pots or boxes in autumn, and covered over with a few inches of soil or ashes until wanted for gentle forcing. This takes place from Christmas onwards. The bulbs are also planted 3 or 4 in. apart in cold



Fig. 203.—*Gladiolus Gandavensis*

frames and protected with the lights to yield a succession. The same treatment is given the forms of *G. nanus*, which produces long graceful sprays of rose, pink, and blotched flowers with great freedom. These forms have been evolved from such species as *trimaculatus*, *tristis*, *blundus*, *cardinalis*, &c., kinds which are to be found in botanical collections. The more showy kinds of *Gladiolus*, like *brenchleyensis*, *Childsi*, *Lemoinei*, *nanceianus*, and *gandavensis* are planted in March or April in rich and well-prepared soil 6-8 in. apart in rows, the corms being covered with 3 or 4 in. of soil. The flower spikes appear in August and September,



Fig. 204.—*Gladiolus Lemoinei*



Fig. 205.—*Gladiolus nanceianus*

and find a good sale amongst florists. After the flowering is over the corms should be lifted, cleaned, and stored away in frostproof, dry, and airy cellars or lofts. The offsets and spawn should be detached from the larger corms and kept separate, planting them out in spring in places by themselves until they reach the flowering stage.

Gnaphalium.—A large genus closely related to *Antennaria*, having a few species of garden value. *G. lanatum* is remarkable for its fine silvery foliage and dwarf habit, and is used as an edging for beds and borders. *G. microphyllum* is used in the same way, but has very small crinkled silvery leaves. The "Edelweiss" is *G. Leontopodium* (or *Leontopodium alpinum*). It is easily raised from seeds sown in spring, and small plants in pots find a ready sale.

Godetia.—Beautiful and popular hardy annuals with many varieties, all easily raised from seed sown under glass or in the open air in spring. Young plants sell readily in shallow boxes in spring for purposes of summer bedding. They grow 1–2 ft. high, have oblong lance-shaped leaves and numerous blossoms varying (according to variety) from pure white to rose, deep red, crimson, &c., many being beautifully blotched with other shades. Duchess of Albany, Lady Albemarle, and The Bride are amongst the best-known varieties.

Golden Feather.—See *Pyrethrum aureum*.

Grasses, Ornamental.—Apart from the Pampas Grass (*Gynerium* or *Cortadeira*), the Cock's-foot Grass (*Dactylis*), there are several kinds useful for cutting, and often employed with floral decorations. Among these are the Bunch Grass (*Elymus arenarius*); Cloud Grass (*Agrostis nebulosa*); the Waved Hair Grass (*Aira flexuosa*); the Sweet Vernal Grass (*Anthoxanthum odoratum*); the Quaking Grasses (*Briza maxima*, *B. media*, and *B. minor*), all easily recognized by their drooping spikelets with overlapping scales; the Brome Grass (*Bromus briziformis*); Soft Grass (*Holcus lanatus variegatus*); the Sheep's Fescue (*Festuca ovina*); the

Squirrel-tail Grass (*Hordeum jubatum*); the Feather Grass (*Stipa pennata*); Gardeners' Garters (*Phalaris arundinacea variegata*); the Hare's-tail Grass (*Lagurus ovatus*); and others, all the annual kinds being easily grown and raised from seeds. Others are *Apera arundinacea* and *Erianthus Ravennæ*.

Gunnera. — Coarse, bold-growing, and ornamental Chilian plants with immense Rhubarb-like leaves, often 6–9 ft. across. The small flowers are borne on large erect club-like spikes in the centre of the plant. The plants are quite hardy in most places, and flourish on the banks of lakes, ponds, streams, &c. The best kinds are *manicata* and *scabra*, otherwise known as *chilensis*. They are propagated by division or seeds in spring. Trade very limited.

Gynerium (Cortadeira) argenteum (fig. 206).—This is the



Fig. 206.—Pampas Grass

well-known Pampas Grass of South America, with long grey-green sword-like leaves, 6 ft. or more long, and dense erect silvery-white plumes of flowers borne on stalks 10-12 ft. high. Tufts are sold generally in spring, but the trade is not large. Warm, sheltered, and sunny spots are best for the plants, and each autumn a top-dressing of well-rotted manure will be beneficial. There is a variety *roseum* with rose-coloured plumes. *G. conspicua*, the Silvery Reed Grass of New Zealand, is a kind of smaller Pampas Grass worth stocking by hardy-plantmen. It grows about 5 ft. high.

Gypsophila elegans.—A charming Caucasian annual, 1-1½ ft. high, with masses of pure-white flowers borne on slender hair-like stems. Seeds are sown in the open air two or three times during the year in the shallow drills about 6 in. apart, chiefly to supply cut flower to the florists. *G. viscosa* is a soft rose-coloured form also grown. *G. paniculata* and its double-flowered variety are the best known of the perennial kinds. They have thick parsnip-like roots, and make dense bushes, 2-3 ft. high, smothered in small white flowers. Used for cut bloom in the same way as *G. elegans*, and may be increased by division in spring or autumn, or from seeds. Other kinds are *G. cerastioides*, 3 in., white, from the Himalayas, and *G. repens*, 4 in., rosy white.

Haberlea rhodopensis.—A charming Ramondia-like plant, 4-8 in. high, with flat tufts of coarsely-toothed leaves, and umbels of pale-lilac bell-shaped drooping flowers in summer. The plants like a peaty soil in cool shaded positions, and are essentially rock plants. They may be increased by seeds and careful division.

Helenium.—Easily grown plants of the Sunflower family, flourishing in any garden soil and in open sunny spots, and easily increased by division in autumn or spring. The best kinds are *autumnale*, 4-6 ft., pure yellow, several varieties, of which "Riverton Gem", "Riverton Beauty", and "Gartensonne" are the very best; *Bolanderi*, 2 ft., yellow, with a dark centre; *Hooperi*, 2-3 ft., bright orange; *nudiflorum* (or *grandicephalum striatum*), 3-4 ft., deep orange yellow striped and blotched with crimson; *pumilum*, 1 ft., soft yellow. These all flower freely, and are valuable for cut flowers during the summer months. *H. Bigelovi* is a fine Californian species, about 4 ft. high, with large yellow flowers having a deep red-brown centre.

Helianthus (SUNFLOWER).—There are annual and perennial species of Sunflower, but very few are grown extensively for market. The best perennial kind is *H. rigidus* (formerly known as *Harpalium*). This grows 3-5 ft. high, has roughish purple stems, and yellow flower heads about 3 in. across with a darker centre. Until its fine variety "Miss Mellish", with taller stems, larger and brighter yellow flowers, made its appearance, *H. rigidus* was often grown as a catch crop in any out-of-the-way part of the garden for cut flowers in late July and August. The variety is a much better plant, but to get the best results the snake's-head-like rhizomes should be planted at least 1 ft. apart. Once established, the plants look

after themselves, and increase with astonishing rapidity—so much so that they are apt to choke themselves in the struggle for air and light. They should be thinned out to 1 ft. apart every spring. Bunches of twelve sprays realize from 1s. to 3s. per dozen—sometimes much less. Other species of Perennial Sunflower worth growing as catch crops for cut flower are *H. decapetalus*, 4 ft.; *H. giganteus*, 10–12 ft.; and *H. multiflorus*, 3–5 ft. The last has fine double-flowered varieties like *Bouquet d'Or*, *flore pleno*, and *Soleil d'Or* or *grandiplenus*—all worth a place for cut bloom, as they are fine in colour and last well when cut. *H. sparsifolius* is a newer plant about 8 ft. high, with fine leaves, and very large bright yellow flowers with pointed petals.

Helleborus niger (CHRISTMAS ROSE) (fig. 207).—This is grown extensively in some market gardens between rows of Apples, Pears, Plums, &c.,

chiefly for the large pure-white blossoms which appear naturally at Christmas time and later. The plants like a rich, cool, moist soil and semi-shaded places, and should always be planted early in spring after the flowers have faded. For forcing purposes they are very valuable. Clumps are lifted in November or earlier, just as the buds begin to appear, and are placed in shallow boxes. These are transferred to a greenhouse with gentle warmth, and when kept just moist the flowers open with great purity of colour, and are then bunched up for market, the prices realized varying from 3d. to 6d. and 9d. per bunch according to circumstances. Clumps that

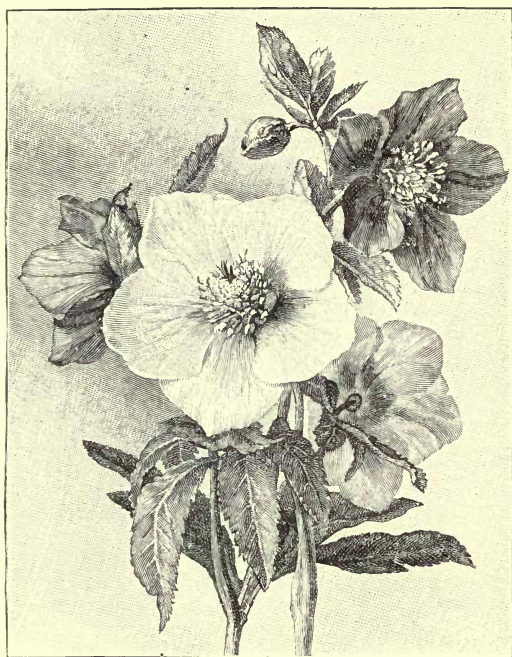


Fig. 207.—*Helleborus niger*

have been gently forced in this way are afterwards planted in the open, and are not forced again until at least two winters later. A fresh batch of plants is used instead, and they rest in due course while another batch is being forced into early bloom.

There are many kinds of Hellebores besides *H. niger* in which nurserymen do a trade with owners of private gardens, &c. The following may be noted: *orientalis*, the Lenten Rose, with rosy flowers from February to May; *odorus*, green and purple, fragrant; *atrorubens*, deep purple; *punctatus*, pale red, spotted; *colchicus*, bright purple; *fetidus*, green-

tipped purple; *olympicus*, purple; and many beautiful hybrid varieties known under the name of *guttatus*.

Hemerocallis (DAY LILY).—Although lovely and easily grown garden flowers the Day Lilies are useless for cut bloom, as they fade so quickly, notwithstanding the fact that one bloom opens as rapidly as another withers. They grow in any garden soil, and are perhaps more at home in semi-shaded spots. Clumps of the plants starting into growth in spring find a fairly good sale with other kinds of roots. They are nearly all easily increased by dividing the rootstocks in early autumn. The following are the best kinds: *aurantiaca major*, rich apricot yellow; *Dumortieri*, soft yellow and orange (fig. 208); *flava*, orange yellow with narrow leaves; *fulva*, tawny yellow with several fine forms, some tinted with crimson; *Middendorfi*, pale golden yellow; *minor* or *graminea*, grows only about 1 ft. high, and has pale-yellow flowers; *Thunbergi*, canary yellow.



Fig. 208.—*Hemerocallis Dumortieri*

Heracleum giganteum (or *villosum*).—A coarse-growing but very ornamental plant, 6–10 ft. high, with thick, green and purplish stems, large-lobed spreading leaves, and masses of small white flowers borne in umbels 18 in. or more across. This is the common “Cow Parsnip”, the seeds and plants of which were largely sold a few years ago under the name of the “Cartwheel Flower”. It grows in any coarse soil and in almost any place, and is easily raised from seeds every year to flower the following season.

Herniaria glabra.—A prostrate British herb, forming dense masses of small green leaves, that render it valuable for carpet bedding.

Heuchera sanguinea.—This magnificent hardy perennial, although it sells well with nurserymen, has not yet become so popular as it deserves to be in the market. There are several varieties, some being comparatively poor and worthless from a selling point of view. The varieties known as *splendens* and *grandiflora* are the only ones worth growing for cut flowers, as they have very long stems and numerous crimson-scarlet bell-shaped flowers which last a long time. The Heucheras should be grown in rich, gritty, well-drained soil, in warm sunny spots, and may be increased by division in early autumn. This is the only way to keep a fine variety pure. Seedlings are easily raised, but there are likely to be many miserable forms amongst them. There are several other species.

Hibiscus africanus major (also known as *H. Trionum*).—A beautiful hardy annual, 2 ft. high, with Mallow-like leaves and flowers, the latter being 2 in. across, yellow, with a purple or deep-violet centre.

Holeus mollis variegatus.—This is a beautiful grass plant, forming tufts of soft downy leaves striped with green and clear silvery white. It is effective as an edging plant, and is much used in some public gardens. It is easily increased by division in autumn or in spring. *H. lanatus albo-variegatus* appears to be identical.

Hollyhock (*Althaea rosea*).—More than three hundred years ago the Hollyhock came from China, and is still a garden favourite. One time, indeed, before other beautiful hardy rivals became common, great attention was given to the improvement of the Hollyhock, and specialists will recall such names as Chater, Bircham, Baron, Paul, Roake, and the Rev. Edward (afterwards Lord) Hawke as amongst those who took particular interest in the plant. In the middle of the nineteenth century—the '60's—Hollyhocks were at every exhibition, and were as popular then as the Sweet Pea is to-day. Owing to the great demand for the plant, it was propagated with the utmost speed in hothouses from seeds and cuttings, with the result that the constitution of a perfectly hardy plant was undermined and weakened. The plants throughout the kingdom and also on the Continent fell a prey to the terrible Hollyhock Disease (*Puccinia malvacearum*), which still appears in places every year, blistering the under surface of the leaves with its raised brown or yellowish pustules. The Hollyhock was therefore rendered *hors de combat* for many years, because the spread of the disease could not be checked. Consequently it dropped, and its place was taken by other plants in the meantime.

At the present day a great trade is done in the young plants in spring. These are raised from seeds sown the previous April or May, and when large enough are transplanted in rows about 1 ft. apart every way, in fairly good garden soil, and in open sunny situations if possible. Where a trade is done in particularly fine varieties, these are usually propagated by cuttings of the sturdy non-flowering side and basal shoots during the summer months. They are inserted in sandy soil in pots or pans or frames, gently watered in and shaded from strong sunshine until established, when they are allowed plenty of air and light. The tufts of old plants may also be split up into pieces, each having portions of root attached. Grafting of special varieties on to common stocks used to be practised, but in these days it would not pay for the trouble. Besides these methods it is possible to raise and flower Hollyhocks from seed the first year. The seeds should be sown in rich gritty mould in January and February in a temperature of 65° to 70° F. They soon germinate, and when large enough to handle easily are pricked out about 3 in. apart in boxes, or placed singly in 3-in. pots. They are grown on rapidly for a time, but are eventually hardened off gradually with plenty of air and a cooler atmosphere so as to be ready for sale in May.

For garden decoration, as bold masses in the border or in beds by them-

selves, Hollyhocks are very useful. They should be planted about 2 ft. apart, and as they are gross feeders the soil cannot be too rich, and at the same time well drained. When coming into flower they will benefit by occasional doses of weak liquid manure, or some proprietary manure sprinkled over the soil and hoed in where the plants are well established will help them considerably. To have a good supply of bloom open at one time, the tips of the flower stems should be pinched out. This will check further upward growth, with the result that the blossoms will open together.

There are many single and beautiful double varieties, varying in colour from the purest white to the deepest rose, crimson, mauve, magenta, and purple, and the brightest and softest of yellows; but of blues there is none. At one time specialists gave fancy names to their pet varieties, but nowadays they are designated by colour or by single and double varieties (fig. 209).

In hot, dry seasons both Red Spider and greenfly are likely to be troublesome. They may be prevented by syringing the plants freely morning and evening with insecticides or soft-soapy water. The fungus already referred to is checked by syringing with liver-of-sulphur solution (1 oz. to 3 or 4 gal. of water) or by spraying boiling water over the foliage with a fine syringe. Badly infected leaves are best picked off and burnt immediately.

Honesty.—This is the popular name for *Lunaria biennis* (or *L. annua*). It is closely related to the Wallflower, and grows 2-3 ft. high, with violet-purple or white flowers in summer. It is grown chiefly for its large roundish seed pods, which, when ripe, have beautiful silvery partitions that sell well during the autumn and winter seasons for harvest festivals, room decorations, &c. The plant, which has large, heart-shaped, coarsely toothed leaves, is raised from seeds sown in shallow drills in April or May to produce flowers and silvery pods the year following. The form with variegated leaves is becoming known as a useful bedding or "dot"



Fig. 209.—Double Hollyhocks

plant among dwarfer subjects such as Aubrietias, Forget-me-nots, Violas, Alyssums, &c.

Hop (*Humulus Lupulus*).—The rootstocks of the common British Hop find a good sale in spring, and are put up in boxes for market during the season. The female kind is most appreciated, as it produces the large bunches of greenish-yellow scale-like flowers during the summer months. The Hop grows in any good garden soil, and is easily increased by division. The Japanese Hop (*H. japonicus*) is an ornamental annual species, having strong-climbing hairy stems 15–20 ft. long, and five- to seven-lobed leaves. There is also a variegated form worth growing. As both can be raised easily from seeds sown in heat in March, it is possible to have young plants ready for sale and hardened off by the middle or end of May.

Hyacinth.—The florist's Hyacinth has descended in the course of centuries from the wild *Hyacinthus orientalis*, and there are now hundreds of varieties on the market. A good trade is done not only in the bulbs in autumn, but also in forced flowering plants in pots or ornamental bowls early in the year, and in the cut bloom. The bulbs for planting in gardens may be purchased wholesale from Dutch growers from 90s. and upwards per 1000 in mixed varieties; while bulbs in separate colours, requiring more care and selection, will cost anything from 110s. to 130s. per 1000. The choicest varieties, however, true to name and colour, will cost from 20s. to 50s. and more per 100 wholesale, to which carriage, &c., must be added. Prices fluctuate every year according to good or bad seasons, and other trade influences.

For market purposes Hyacinths are usually grown in pots. Three bulbs are placed in a 5-in. (48) pot, in fairly good soil, the bulbs being about half-buried, with the tops level with the rim of the pot or a little above it. They are potted up as soon as possible in September and October, and the pots being placed side by side are covered over with about 6 in. of soil or sifted ashes (not, however, before an inverted flower pot is put over the bulbs)—as a protection against frost, and also to encourage the development of roots. As required for market, batches are brought into a warm greenhouse, with a night temperature of not less than 60° or 65° F., where they soon push their leaves and flower spikes under proper attention to watering, &c. When the “bells”—as the flowers are often called—are nicely open, a slender stake is driven into each bulb, and the flower spike is tied to it with a piece of raffia. This prevents it falling over, and enables the plants to ride better in transit to market by road or rail when packed in shallow boxes. Some growers only use one stake, and tie the raffia from that round the three spikes of bloom—thus saving stakes, raffia, time, and labour. Hundreds of thousands of pot Hyacinths find their way to market every winter and spring season—from Christmas to the end of April—and one can imagine the weight and expense in pots and soil this involves, apart from the money spent in firing to bring the flowers on at the proper time. Something like 200 varieties of single-flowered and from 60 to 100 double-flowered Hyacinths are catalogued,

but only very few find favour amongst growers for market. The most popular are: *La Grandesse* and *Mont Blanc*, among single whites, and *La Tour de Vierge*, double white.

The best market Red Hyacinths are *Garibaldi*, *General Pelissier*, both early; and *Robert Steiger*, late. The best blues are *Leopold I* and *Charles Dickens*, and the best pinks are *Moreno*, single, and *Noble Permerette*, double.

Large numbers of Hyacinth bulbs are sold also for cultivation in the open air, in bowls, vases, &c., as practised by private growers and public gardeners.

ROMAN HYACINTHS.—A fairly good trade is done in what are known as French Roman Hyacinths and in Dutch Roman or Miniature Hyacinths. The price of the former to the grower for market varies from 10s. 6d. to 20s. and 30s. per 100 for bulbs according to size and quality, the usual sizes being 12 to 13 cm. in circumference. Of late years the prices have increased greatly. The Miniature or Dutch Roman Hyacinths, obtainable in red, rose, white, blush, dark and light blue, and yellow colours, are much cheaper than the French Romans, 100 bulbs costing about 5s. Growers for cut flowers usually buy in thousands because they can secure better terms, and because it is necessary to have a fairly good supply to cut from. The White Roman Hyacinths are the most favoured for market work. Each bulb produces from one to three trusses of fine glistening-white sweetly scented flowers during the winter months, when the bulbs are easily forced. If not grown for sale in pots in the same way as the ordinary florist's Hyacinth, the bulbs of Roman Hyacinths are generally placed side by side in shallow wooden boxes on a layer of good soil, about half the bulb being left exposed. Until root action is established, however, the bulbs are kept outside or in a cool place covered with about 6 in. of soil or fine ashes, and are brought into a house having a temperature from 65° to 75° F., as they are required.

Incarvillea Delavayi (fig. 210).—A fine fleshy-rooted Chinese perennial about 2 ft., with coarsely toothed leaflets and trusses of tubular rosy-carmine flowers spotted with brown and yellow



Fig. 210.—*Incarvillea Delavayi*

in the throat. *I. grandiflora* is a somewhat similar plant, quite as vigorous, and with much deeper coloured rose-purple flowers. Both kinds are sold to lovers of choice hardy flowers, and realize good prices, but the trade is limited. They flourish in any good garden soil in warm sunny spots, and may be raised from seeds sown under glass, and by division of the rootstocks in early autumn. *I. Koopmanni*, mauve pink; *I. Olga*, rose purple; *I. lutea*, yellow; and *I. variabilis*, rose purple, are other species.

Inula glandulosa.—This ornamental Caucasian hardy perennial grows in any garden soil, and is easily increased by seeds, division, and from root cuttings under glass. It grows about 2 ft. high, and has oblong serrate leaves, and large bright-orange Marguerite-like flower heads in July and August; valuable for cutting. Other species are *grandiflora*, *Helenium*, *Hookeri*, and *Oculus-Christi*—all 2-3 ft. high, and with yellow flowers.

Iris (FLAG).—A large genus of beautiful-flowering herbaceous plants having either bulbs or rhizomes. For market purposes the German (*I. ger-*

manica) and Florentine (*I. florentina*) are the best. They grow in any soil and are easily accommodated in out-of-the-way borders, or between rows of standard and half-standard fruit trees. They are chiefly valuable for the large splendid purple and pale-lilac or white flowers which are produced in great profusion in May, and generally sell well, although the individual flowers do not last a long time. With the German and Florentine Irises market growers would do well to associate other "bearded" and gaily coloured kinds as follows: *aphylla*, with frilled flowers having bright colours on a white ground; *amœna*, with white standards, and falls of various shades; *neglecta*, with standards varying from lavender to purple; *pallida*, with flowers mostly of lavender, blue, or rosy shades; *squalens*, shades of



Fig. 211.—*Iris laevigata* (Kämpferi)

copper, bronze, and pale brown; *variegata*, standards yellow with claret-brown falls. In each of these sections there are numerous varieties (some with fancy names), and they may be all regarded as valuable market plants—chiefly for cut flowers, but also for the "roots".

The next most important commercial Iris is the Spanish one (*I. Xiphion*), a beautiful bulbous species in which a fine trade is done in the bulbs amongst amateurs, market, private, and public gardeners in the autumn. Hundreds of thousands of bulbs are imported from Holland. Market growers usually purchase to obtain cut flowers in early summer before

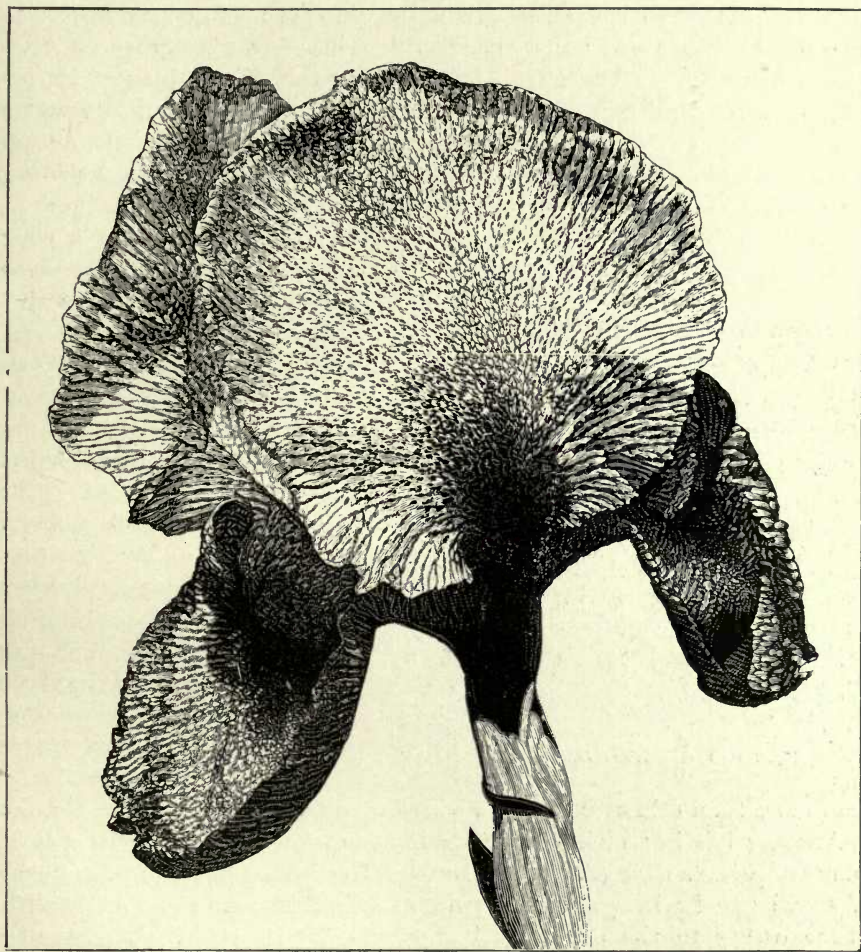


Fig. 212.—*Iris Susiana*

the open-air blossoms appear in May and June. The bulbs are placed in shallow boxes or 2 or 3 in. apart in large pots in good rich soil, and buried an inch or two below the surface. Root action is established out-of-doors or in cold frames, and the pots or boxes are brought into the greenhouses from Christmas onwards as required. Forcing is very gentle, 60° to 65° F. being sufficient, and better than a higher temperature. When grown in pots, the plants, flowers, and all may be sold as they stand, if worth while. The chief trade, however, is in the cut flowers, and if these

reach market at a favourable time good prices are realized. Even in May and June, prices for blooms of Spanish Irises are by no means to be despised, although much lower than for those of earlier indoor crops. Outdoor plants flourish in any good and well-drained garden soil in a warm sunny position. Perhaps the foot of a south wall where Peaches, Nectarines, or other fruit trees are grown is one of the best positions for them; and although the bulbs gradually die out, a crop may be secured for several seasons after the first planting in early autumn.

Another class of business is done in Spanish Iris. Unopened spikes of bloom from Southern France, &c., find their way to Covent Garden and

other British markets, and are purchased by market growers, who take them home and open them in the warmth of a greenhouse, the stems of course being placed in jars of water. In a day or two the blossoms open, and are then taken back and resold to florists and others, leaving the enterprising marketman and the foreigner both more or less satisfied. There are many beautiful kinds of Spanish Irises with fancy names, the colours varying from fine white to white with orange or yellow blotches, and pure yellows, pure blues light and dark, lavender, bronze, &c., many being beautifully fumed or smoked. Some varieties cost



Fig. 213.—English Irises (*Iris xiphoides*)

much more than others, but good results are obtained from fine mixtures.

Another Iris in which some trade is done is the variegated form of the Common British Flag (*I. pseudacorus*). The leaves in spring are beautifully variegated with green and gold, and in this state roots sell well for a time owing to the ornamental appearance. During the summer and autumn, however, the variegation gradually disappears, but reappears the following spring with the new leaves. Moist and half-shady spots should be chosen to grow this variegated plant well; also the variegated form of the Gladwin or Roast Beef Plant (*I. foetidissima*).

While the Irises mentioned above constitute the bulk of the market grower's stock in trade, many more species are dealt in by hardy plant growers, but of course in comparatively small quantities. The trade, however, is increasing of late years, as owners of gardens are beginning to recognize the decorative value of the numerous species of Iris, and the ease with which most of them may be grown. These Irises may be

divided into bulbous and rhizomatous groups, the latter including the Japanese Iris, *I. laevigata* or *Kämpferi* (fig. 211), and also the gorgeous-flowered "Cushion" or "Oncoeyclus" Irises. The reader will find full botanical and cultural details of these charming Irises either in the *Practical Guide to Garden Plants* or in *The Bulb Book* (J. Weathers). Special attention, however, may be called to *Iris Susiana* (fig. 212), a magnificent species rather difficult to grow; and to the English Irises (fig. 213), which are similar to the Spanish Irises, and might very well become more popular for cutting purposes amongst market growers.

Isopyrum thalictroides.—A charming plant, 9–15 in. high, with Maidenhair-like leaves and small white flowers in April and May. It is easily grown and raised from seeds, and by division.

Ixia.—This is a genus of bulbous plants, natives of South Africa, with fibrous-coated corms, and long spikes of lovely flowers excellent for cutting purposes. Unfortunately they can only be grown in the open air in the mildest parts of the kingdom, but market growers in the south and west of England, and in most parts of Ireland, should be able to reap fair results from their growth. There are several fine species, of which *crateroides* or *speciosa*, with brilliant crimson flowers, and *viridiflora*, with deep sea-green flowers with a black blotch in the centre, are the most noteworthy. The hybrid forms, however, are somewhat hardier, and have many charming shades of colour from white to pink, cerise, orange yellow, magenta purple, &c. Bulbs or corms can be bought wholesale for 20s. to 70s. per 1000 according to variety, but growers' mixtures (good enough for market work) are obtainable for about 5s. per 1000 bulbs.

Kaulfussia amelloides.—A pretty, hairy, South African hardy or half-hardy annual, with deep-blue daisy-like flower heads having a yellow centre. There are numerous forms, having flowers of white, rose, carmine, violet, &c.

Kniphofia.—Still popularly known under the old name of *Tritoma*, this genus contains several species of very ornamental herbaceous perennials. The trade done in them is, however, almost entirely confined to the nurseryman, under



Fig. 214.—*Kniphofia maxima (grandis)*

such popular names as "Torch Lily", "Red Hot Poker", and "Flame Flower". The illustration (fig. 214) will give a good idea of the general appearance of the plants when in blossom, the large conical heads of flowers, often flaming red in colour, standing well above the sword-like leaves. Perhaps the kind most useful to the market grower is *K. aloides* (still well known as *Tritoma Uvaria*). It is a magnificent South African plant, 3-5 ft. high, with stout spikes of brilliant orange-red flowers in August. There are several varieties, amongst the best being *glaucescens*,



Fig. 215.—*Kniphofia Macowani*

6 ft., vermillion; *grandiflora* (or *densa*), 6 ft., coral red; *nobilis*, 8 ft., still finer; *Pfitzeri*, 6 ft., crimson scarlet; *Saundersi*, orange scarlet; and others. These all flourish in most parts of England and Ireland and the south-west of Scotland, but are scarcely suitable for the colder parts of the kingdom. They may be increased by division in spring, and may also be raised from seeds, which will produce flowering plants in a couple of seasons. For cut-flower purposes they are valuable in late summer, and the plants may also be sold with other "root" crops in spring. Other kinds of *Kniphofia* sold are: *breviflora*, 2 ft., bright yellow; *Burchelli*, 2-3 ft., bright red and yellow; *caulescens*, 2-3 ft., deep red turning to yellow; *comosa*, 2-3 ft., canary yellow; *citrina*, 3 ft., pale yellow; *corallina*, 3 ft., coral red; *foliosa* (or *Quartiniana*), 4 ft., bright yellow; *Leichtlini*, 3-4 ft., red; *longicollis* (or *primulina*), 3 ft., yellow; *Macowani* (fig. 215), 1-2 ft., bright orange red and yellow; *modesta*, 2-3 ft., white; *Nelsoni*, 2 ft., orange scarlet; *Northiae*, 6 ft., deep red to yellow; *pumila*, orange red; *Rooperi*, 2-4 ft., orange red to yellow, early; *rufa*, 3 ft., yellow with red tips; *sarmentosa*, 2-4 ft., red and yellow; *Tucki*, 2-3 ft., pale yellow, tinted red. Besides these species there are several fine hybrids and seedling forms that have been raised of late years; some of them are particularly fine, and ought to develop into good market plants. The flower spikes are taller and bolder, and the colours of the flowers are much more brilliant.

Kochia scoparia.—Under this name *Chenopodium scoparium* is now largely grown from seeds every year, the plants being used for bedding out in summer. They are popularly known under the names of "Belvedere"

and "Lawn Cypress". They grow from 3-5 ft. high, and form dense columnar bushy plants with narrow leaves, which, at first pale green, turn to beautiful crimson or purple shades in autumn. *K. trichophylla* is another species or variety with the same characteristics. The plants may be raised in heat in spring from seeds, and will be ready for planting out at the end of May.

Leucojum (SNOWFLAKE).—Beautiful hardy bulbous plants with strap-shaped leaves and flowers like large Snowdrops tipped with green. They grow in any good garden soil, the best varieties being the Spring Snowflake (*L. vernum*, fig. 216), which has white flowers in March and April on stalks 6-12 in. high, and its variety, *carpaticum*; and the Summer Snowflake (*L. aestivum*), with several flowers. *L. pulchellum* is closely related but flowers later. The trade is done chiefly in the bulbs in autumn.

Liatris.—A group of showy perennials, easily grown in ordinary soil, and increased by seeds and division. The best kinds include *elegans*, 2-4 ft.; *graminifolia*, a tuberous-rooted species, 2 ft.; *odoratissima*, 2-4 ft.; *pycnostachya*, 4 ft.; *punctata*, 1½ ft.; *scariosa*, 2 ft.; *spicata*, 2 ft.; and *squarrosa*, 2-3 ft.—all with long erect racemes of bright rose-purple flowers from July to September, and all natives of North America.

Lilium.—Apart from the kinds grown under glass by market growers (see p. 179) the trade done in other species of *Lilium* is practically confined to the nurseryman. Here and there one finds a patch of the Turk's Cap Lily (*L. Martagon*), *L. chalcedonicum*, or some other hardy species in a market garden, but it is looked upon as a crop of no great importance. Some of the fine, easily grown, and free-flowering kinds, however, would probably pay for more extended cultivation amongst market growers. After the first cost, very little expense would be incurred, and the flowers would more than pay the rent, labour, &c., year after year. In fact, wherever Daffodils are grown, there also could *Liliums* be grown with them on the same piece of land. The Daffodils are all over by June, just at a time when the *Liliums* are coming well into flower. The following *Liliums* may be recommended for cut flowers grown in the open air: *L. auratum* (fig. 217) and its varieties, white banded with yellow and blotched purple; *L. Burbanki*, a free-flowering hybrid between *L. pardalinum* and *L. Washingtonianum*, orange yellow, spotted purple; *L. elegans*



Fig. 216.—Snowflake (*Leucojum vernum*)

(*Thunbergianum*), a magnificent lily about 2 ft. high, with erect orange-crimson cup-shaped flowers lightly spotted; very free and hardy, and may be left several years in the same spot. There are several fine varieties—all good for cut flower. *L. Hansonii*, 3-4 ft., with numerous bright orange-yellow flowers, very free. *L. Henryi*, 3-8 ft., rich orange-red flowers from July to September; *L. Humboldtii*, 4-8 ft., rich orange-yellow flowers, spotted purple, very free; *L. Martagon*, 3-2 ft., purple red, spotted carmine; *L. monadelphum* (*Loddigesianum*), 3-5 ft., clear pale yellow; the variety



Fig. 217.—*Lilium auratum*

Szovitsianum (or *colchicum*) is still better, having beautiful citron-yellow flowers spotted with blackish purple, sometimes thirty on a single stem; *L. pardalinum*, the Leopard Lily, 3-8 ft. high, bright orange red, spotted deep blue, very free; there are several good forms; *L. triginum*—the Tiger Lily, 2-4 ft., deep orange red, spotted blackish purple; *testaceum* (or *excelsum*), 5-6 ft., nankeen yellow or apricot dotted with orange red.

These *Liliums* are all easily grown in the open air in good, deeply dug, well-drained, and well-manured garden soil. They should be grown in beds about 4-5 ft. wide, and the tops of the bulbs should be planted about 6 in. below the surface, the distance apart for market work being about 1 ft.

Bulbs of *Narcissi* and *Daffodils* could be planted between the *Lilies*, and in this way the two crops would not interfere with each other in the least, and one would naturally succeed the other. When the *Narcissi* have quite died down by the end of June, the surface of the ground could be carefully hoed between the *Liliums*; and in October or November a light dressing of well-rotted manure would be beneficial to both crops.

Lily of the Valley (*Convallaria majalis*).—For sixty years or more the Lily of the Valley has been a favourite flower with market growers, but there are millions grown now where there were only hundreds grown half a century ago. Indeed there are now many thousands of acres of land on the Continent and in the British Islands solely devoted to the cultivation of Lily of the Valley “crowns”, and the trade has been encouraged largely

by the introduction of the refrigerating or retarding system into horticulture. Lilies of the Valley can now be had in bloom at all seasons of the year, either by forcing them in winter or retarding them in summer (fig. 218).

To secure the finest crowns for forcing, growers prefer a light sandy soil that is naturally cool and moist, but yet well drained. In such a soil the finest forcing crowns are produced after two or three years of cultivation. From August to December large purchases are made by growers, the "Berlin" variety being largely used for winter and early spring work. From October onwards the crowns are placed in pots or kipper boxes, the tops of the crowns being flush with the top of the receptacles. A light



Fig. 218.—Lily of the Valley forced for Market

sifted soil of almost any description is used, and worked in between the crowns. About one dozen are put into a 5-in. pot; but in boxes the crowns are placed about 1 in. apart every way. The plants are then given a good watering, and if it is intended to force them at once, they are plunged up to the rims in beds of coconut fibre, moss, or leaf mould, and perhaps a layer of moss 3 or 4 in. thick is placed over them. The temperature is kept up between 80° and 95° F., and care is taken never to let it drop below 80° or to rise above 100°. The beds or chambers in which the plants are placed should be perfectly dark, and this is best done by placing boarded lights over them. Water must be given in great abundance each day, taking care that it is of the same temperature—say 80° F.—as the bed in which the plants are placed.

When the shoots are about 2 or 3 in. high the moss is taken off the tops and a little light is admitted gradually. As soon as the blossoms appear, overhead watering is discontinued, and the plants are moved from the forcing bed to a somewhat cooler place and receive more light. Other

batches then take their place in the forcing chamber. Before Christmas it takes from three to four weeks to force Lilies of the Valley into bloom, but the time is reduced to three weeks and less with the turn of the year.

RETARDING.—This process consists in placing the crowns in refrigerating chambers having a temperature of 28° to 30° F., just low enough to keep the plants in a dormant condition without injury. During the summer months the crowns are taken out as required and put into pots or boxes in light soil. They soon start into growth in a greenhouse without being forced, and only require attention to watering, &c., daily. There are shown on the accompanying plate (1) how the crowns are packed in bundles in the refrigerators; (2) how they are potted up; (3) the growth made at the end of a fortnight; and (4) the plants in full bloom at the end of three weeks. While the Berlin variety is the best for forcing, the "Fortin" variety and the "Victoria" are best for retarded blooms.

OPEN-AIR CULTURE.—A good trade is done in Lilies of the Valley grown naturally in the open air. The best time to plant is in early autumn—September if possible—and cool, sheltered spots should be chosen. The soil should be of a light sandy loam, naturally moist, but well drained, deeply dug, and well manured. Between rows of widely planted standard fruit trees is a good place to make up Lily of the Valley beds. The crowns should be planted 2-3 in. apart in straight rows about 6 in. apart, and the beds should not be more than 4½-5 ft. wide, having an alley 12-18 in. between. The tops of the crowns should be about 1 in. below the surface, and after the beds are planted they may be mulched with a good dressing of well-rotted manure. About March and April lights may be placed over the beds. This will not only hasten the plants into early bloom, but will also protect the flowers from damage by rain and wind, and give them a purity of colour otherwise unattainable. When picking the flowers, the stem should be pulled clean out its entire length with a kind of jerk. Each year it will pay to give a good dressing of well-rotted manure to the beds in early autumn.

GRADING.—No flower pays so well to grade as Lily of the Valley, whether forced, retarded, or natural, and the grower who adopts this course will find a great difference in his receipts.

Linaria (TOAD FLAX).—This large genus includes many plants of garden value, all easily grown, and suitable for rock gardens, old walls, &c., like the common Toad Flax (*L. vulgaris*). Among the dwarfer kinds 2 to 9 in. high are *alpina*, purple and orange, with a rose-coloured variety; *anticaria*, white and lilac; *antirrhinifolia*, forms dense masses with bright-purple flowers; *Cymbalaria* (the Kenilworth Ivy), a well-known British wall plant with purple, lilac, and white-flowered varieties; *hepaticeæfolia*, a carpeting plant about 2 in. high, with lobed leaves and lilac-purple flowers; *organifolia*, 9 in., deep blue and yellow; *pallida*, 3 in., violet purple; *triornithophora*, 6 in., violet. The taller kinds include *geniste-folia*, 4 ft., sulphur yellow; *dalmatica*, 2-4 ft., pale yellow, to which *macedonica* is closely related; *purpurea*, 2 ft., purple; and *vulgaris*, 1-2 ft.,



RETARDED LILIES—LONGIFLORUM AND SPECIOSUM (LANCIFOLIUM) AT THOMAS
ROCHFORD & SON'S NURSERY



(20)

RETARDED LILY OF THE VALLEY
Showing different stages of growth

Photos. Chas. L. Clarke

yellow, with a charming regular-flowered variety called *peloria*. All kinds grow in any good gritty soil, and are increased by seeds and division. There are several annual species also.

Linum (FLAX).—There are several species all easily grown in ordinary garden soil, in open sunny spots. Amongst the best-known kinds are the following: *alpinum*, 1 ft., blue; *flavum*, 1 ft., yellow; *grandiflorum* (fig. 219), 1-1½ ft., a splendid rose-red annual with many forms; *narbonense*, 2 ft., sky blue veined with violet; *perenne*, 1½ ft., bright blue with pink and white varieties; and *usitatissimum*, 1½ ft., the common flax of commerce, with blue flowers. These are all

raised from seeds sown in the open or under glass in spring. *L. arboreum* is a shrubby plant, 1-1½ ft. high, with yellow flowers in summer.

Lithospermum prostratum.—This is the best known of many species. It is a trailing hairy perennial about 4 in. high, with linear leaves and deep-blue flowers. The variety "Heavenly Blue" is much deeper in colour. Other kinds are: *canescens*, 9 in., yellow; *Gastoni*, 1 ft., sky blue with a white eye; *graminifolium*, 1 ft., with long grass-like leaves and blue flowers; *petraeum* (now known as *Moltkia*), 9 in., pinkish purple to violet blue; *purpureo-ceruleum*, 1 ft., deep purple; and *rosmarinifolium*, 9 in., a small bushy plant with Rosemary-like leaves and bright-blue flowers. These plants are excellent for the rock garden, and grow in ordinary good soil. They are increased from seeds, cuttings in cold frames, and by division of the roots.

Lobelia.—The best hardy herbaceous perennial Lobelias are *L. cardinalis* and *L. fulgens* (fig. 220), plants, 1-3 ft. high, with erect dark-coloured stems, lance-shaped leaves, and deep-scarlet spikes of bloom from June to September.

Varieties of *fulgens* known as "Firefly" and "Queen Victoria", both about



Fig. 219.—*Linum grandiflorum*



Fig. 220.—*Lobelia fulgens*

5 ft. high, are particularly fine. There are now several good hybrids in cultivation. For greenhouse and bedding Lobelias see p. 182.

Lupinus.—The Lupines are showy Leguminous plants, all perfectly hardy and easily grown in any ordinary garden soil. They are very orna-



Fig. 221.—*Lupinus polyphyllus*

mental in leaf and blossom, and a fair trade is done in spring in plants of the perennial *L. polyphyllus* and of seed-raised plants of the annual *L. mutabilis*. The latter is a fine Colombian annual, 3-4 ft. high, with tall spikes of Pea-like flowers from June to August, the colours being blue, white, rose, purple, &c., according to variety. *L. polyphyllus* (fig. 221), 3-6 ft. high, having blue, white, and blue-and-white varieties, is the best of the perennials, but there are others. *L. nanus*, 1 ft. or more, is a dwarf annual, having blue-and-lilac, white, and white-and-rose varieties; *L. tricolor elegans* (or *Dun-*

netti) is another annual with deep-violet and white flowers. There are about eighty other species, but most of them of no great value commercially.

Lychnis chalcidonica (fig. 222).—This is the best-known species, 2-3 ft. high, having dense heads of scarlet flowers in summer. It is easily raised by seeds and by division in autumn or spring, and grows in any good garden soil. The trade is chiefly done in "roots" in spring, but it also sells as cut to a certain extent in summer. There is a white-flowered form and a double-flowered scarlet form.



Fig. 222.—*Lychnis chalcidonica*

L. Cæli-rosa (also known as *Agrostemma*) is popularly known as the Rose of Heaven. It is a biennial species about 1 ft. high, from the Levant, and has deep rosy-purple flowers in summer. The seeds should be sown in April and May each year to produce good plants for selling the following spring.

L. coronaria (*Agrostemma*) grows 2-3 ft. high, and has crimson-red flowers and leaves covered with a whitish woolly down. It may be raised in the same way as the Rose of Heaven.

L. Haageana, 1-2 ft., is a fine hybrid with bright-scarlet flowers 2 in. or more across; and *L. oculata*, or *Viscaria oculata*, is a lovely Algerian annual, 1-2 ft. high, having slender erect stems, narrow flax-like leaves, and a great profusion of pinkish-purple flowers in summer. There are several fine varieties like *cardinalis*, bright crimson purple; *cærulea*, bluish, like the Common Flax; *alba*, white; *Dunnetti*, rose; and others all useful for bedding in early summer.

L. viscaria is a pretty evergreen plant with clammy stems, grass-like leaves, and red-purple flowers. The double-flowered form (*flore pleno*), with rose-pink bloom, is the best garden plant; but there are white and other forms, all easily grown.

Lycoris radiata.—A beautiful Chinese and Japanese bulbous plant, 1-1½ ft. high, with bright flowers. *L. squamigera* from Japan, has rose-red flowers or lilac on stems, 2-3 ft. high. *L. aurea* has bright-yellow flowers, but others like *incarnata*, *sanguinea*, and *Sprengeri*, have rose or purple blooms. These bulbs are hardy only in the mildest parts of the kingdom, *L. squamigera* being the hardiest (fig. 224).

Lysimachia nummularia (CREEPING JENNY, MONEYWORT).—This British plant, with creeping stems, roundish glistening-green leaves, and yellow flowers from June to August, is a popular market plant, and is largely grown for window-box decoration in summer and also for rock gardens. It grows in any garden soil, and is easily propagated by division in early autumn. The golden-leaved form (*aurea*) is particularly attractive for ground work, but not for window boxes. In spring the plants are often lifted and placed in 5-in. pots, and stood on shelves in a greenhouse to bring them along earlier and thus secure better prices—about 4s. per dozen—in market. The “roots” are sold freely also, and realize about 6d. per dozen in spring.

Other species of *Lysimachia* are *L. clethroides*, from Japan, 2-3 ft. high, with conical spikes of white flowers from July to



Fig. 223.—*Lycoris radiata*



Fig. 224.—*Lycoris squamigera*

September; and *L. punctata* (or *verticillata*), a bushy plant with yellow flowers.

Malope trifida.—A showy Spanish hardy or half-hardy annual, 1-3 ft. high, with three-lobed mallow-like leaves and large crimson flowers. There are several varieties, including a white one, but the best is *grandiflora*, which has crimson flowers with red and white variations.

Marigold.—The common Marigold is already dealt with under the name of *Calendula officinalis* (which see). The French Marigold (*Tagetes patula*) in numerous varieties grows from 6-12 in. high, has finely divided

leaves, and flower heads of golden brown, yellow, orange, &c., in various shades, many being beautifully striped and mottled. The *nana* or "Pigmy" strain is valuable for edgings.

The African Marigold (*Tagetes erecta*) grows 2 ft. or more high, has lance-shaped leaves deeply cut in on both sides, and produces large heads of beautiful soft-yellow, lemon, and orange flowers.

Both the French and African Marigolds are half-hardy annuals, easily raised from seeds sown in gentle heat in February or March. The young plants are pricked off into shallow boxes, or singly into small pots, and sell readily for

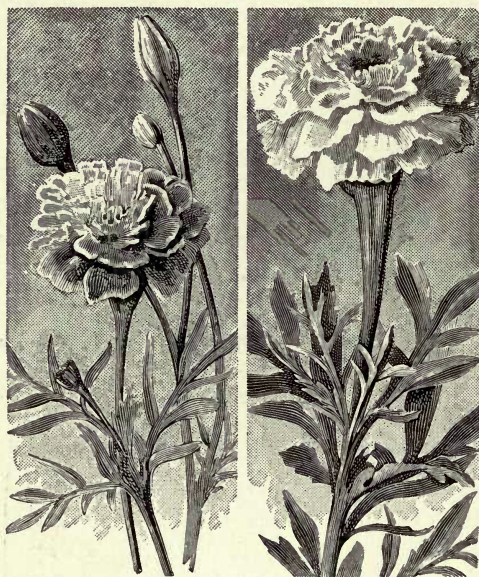


Fig. 225.—French and African Marigolds

bedding out in April, May, and June (fig. 225).

Marvel of Peru (*Mirabilis Jalapa*).—This tuberous-rooted Peruvian perennial is usually treated as a half-hardy annual. It grows 2-4 ft. high, and has large, smooth, oval, pointed leaves, and late in summer masses of long-tubed funnel-shaped flowers, red, white, or yellow in colour, some being blotched or striped with other shades. Other species are *longiflora*, white, pink, or violet, with long tubes; and *multiflora*, bright purple. There are also varieties having variegated leaves, and a dwarf or Tom Thumb strain.

Matricaria inodora.—The double-flowered form (*flore pleno*) of this British annual or biennial is the best for market work, the flowers being useful for "cut" during the summer months. They are white, rounded, with a yellowish centre, and remind one of the flower heads of *Pyrethrum* (or *Chrysanthemum*) *Parthenium* (which see). Notwithstanding the name "inodora" the plants have a peculiar scent which is rather against them. The double-flowered form is best propagated from cuttings in

September, and wintered in a cold frame. Seeds may also be sown in autumn in cold frames, transplanting the seedlings in March or April.

Meconopsis.—A genus of pretty Poppyworts, including the Welsh Poppy (*M. cambrica*), 1–2 ft. high, with pale-yellow flowers; *M. heterophylla*, 1–1½ ft., orange yellow; *M. integrifolia*, 1–1½ ft., a fine biennial, with yellow flowers, from China; *M. nepalensis*, from the Himalayas, also has yellow flowers; while *M. Wallichii* from the same region, has drooping pale-blue flowers on stems 4–6 ft. high. It is a fine plant for moist shady places, and is best raised from seeds sown in spring under glass. The other kinds may be treated in the same way.

Megasea.—This includes the large-leaved Saxifrages of leathery texture, some of the finest plants being the following: *cordifolia*, 1 ft., clear rose, with a deeper variety *purpurea*; *crassifolia*, 1 ft., deep pink; *ligulata*, 1 ft., deep pink, but white in the variety *ciliata*, which flowers from April to May. *Stracheyi* (fig. 226), 9 in., is a fine Himalayan plant with rose-pink flowers. It has a white-flowered form (*alba*), and another called *Milesi*. *M. speciosa* has rich-purple flowers.

Melianthus major (HONEY FLOWER).—A handsome South African plant, 4–6 ft. high, with blue-green leaves cut into four to six pairs of serrated segments. It is raised from seeds sown in heat from January to March, the young plants being sold for bedding purposes, in pots or boxes, in May and June to give subtropical effects later on.

Mentha gibraltaria.—This variety of the British Pennyroyal (*M. Pulegium*) forms dense tufts of deep-green roundish oval leaves, and is an excellent plant for carpet bedding. Increased by cuttings or division under glass.

Mertensia virginica.—A pretty North American perennial, 1–2 ft. high, with ovate lance-shaped leaves and tubular purple-blue flowers from April to June, drooping from the axils of the upper leaves. Another good plant is *sibirica*, 1½ ft., with paler-blue flowers, which in the variety *alba* are white. *M. echioides* is a rare kind, 6 in. high, with rich-blue flowers; and closely related is *primuloides*, with deep gentian-blue flowers. Other kinds grown are *ciliata*, 2 ft., *lanceolata*, 1½ ft., and *oblongifolia*, 1 ft., all with blue flowers. Mertensias flourish in ordinary soil, and are raised from seeds sown in frames, and by division.

Mignonette (*Reseda odorata*).—This has been a favourite market plant for many years, and is still largely cultivated for cut flowers and in pots.



Fig. 226.—*Megasea (Saxifraga) Stracheyi*

The plants may be had in blossom at almost every season of the year, and seeds are sown at different times to keep up a succession. There are, however, two principal sowings—early in August and early in March. The soil used is light gritty loam enriched with well-rotted manure and a little mortar rubble or, better still, a sprinkling of basic slag. The seeds are sown thinly in 5-in. (48's) or 6-in. (32's) pots, and when the young plants are large enough to handle easily they are thinned out, leaving about half a dozen in each pot. They are kept in frames or greenhouses, and given plenty of air and light to induce sturdy growth. Cool treatment is best, as the plants are not then inclined to go blind, but will come into blossom in February and March. Too moist an atmosphere must be guarded against; otherwise many of the plants are likely to damp off during the winter. Besides thinning out, the young plants may also have the tips of the main shoot pinched out to induce a more bushy habit and several columnar spikes of bloom. Some growers allow only one plant to a pot, pegging down the stems to secure several growths. Weak liquid manure may be given when the plants are coming into blossom, as this helps to make foliage deeper in colour and the flower spikes larger. *Mignonette* raised from seed sown in spring may be treated in the same way, but will come into flower more quickly than the autumn-raised plants. When packing for market, two or three small sticks are inserted round the edge of the pots, and a piece of raffia is tied round to keep up the shoots.

Over twenty varieties of *Mignonette* are known, but the "Machet" strains may be regarded as the most generally useful.

Monarda didyma.—This North American perennial is well known as the "Bergamot". It grows 2-3 ft. high, has four-angled stems, heart-shaped fragrant leaves, and heads of bright-scarlet flowers in summer. It is easily grown in moist garden soil, and may be raised from seeds or division. There are a few fine seedling forms of it.

Morina longifolia.—A fine Thistle-like plant, 3 ft. high, with deeply cut spiny leaves, and stout spikes of tubular pink and crimson flowers from June to September. Other kinds are *betonicoides*, 1½ ft., rose purple; and *Coulteriana*, 1½ ft., pale yellow. They are natives of the Himalayas, and require warm sheltered spots in the border or rockery. They are best raised from seeds sown under glass.

Morisia hypogæa.—A pretty Sardinian rock plant, 2 in. high, having rosettes of deep-green cut and lobed leaves, and clear-yellow flowers in April and May. Best raised from seeds.

Muehlenbeckia.—This genus contains a few kinds of curious creeping plants with woody stems and small roundish leaves. They are useful for old tree stumps, &c. The best kinds are *adpressa*, *complexa*, and *nana*.

Myosotidium nobile.—A fine perennial from the Chatham Islands, 1½ ft. high, with large glossy-green plaited leaves, and clusters of rich-blue Forget-me-not-like flowers. This plant is only hardy in the mildest parts of the country, and is increased chiefly by division.

Myosotis. See *Forget-me-not* (see p. 43).



PICKING NARCISSUS IN BUD IN THE SCILLY ISLES

The buds to be opened under glass



(21)

POET'S NARCISSUS GROWN BETWEEN FRUIT TREES IN MR. ROCHESTER'S GARDENS
AT HESTON, MIDDLESEX

Photos. Chas. L. Clarke

Narcissus.—Apart from the kinds grown for market under the name of "Daffodils" (see p. 26), there are several species, varieties, and hybrids now in commerce, some of them exquisite in shape and colour, and varying in price from a few pence per dozen to several pounds per bulb. The common Poet's Narcissus (*N. poeticus*), and its variety *ornatus*, are grown in hundreds of thousands, in the market gardens of Middlesex, Evesham, and other places, beneath fruit trees. They are planted in beds 4–5 ft. wide in rows about 6 in. apart, so that something like a quarter of a million bulbs go to an acre of ground, allowing for pathways, &c. Where the soil is well cultivated and drained, the bulbs live for many years without lifting, and they increase in number at a steady rate. In some places, however, there is a tendency to die out with disease, probably brought about by soil sickness induced by allowing the bulbs to remain for too many years in the same place without lifting. If the flowers happen to come in just at Eastertime a very fair profit may result from the sale of the crop; but if a fortnight sooner or later than Easter the flowers may be a drug on the market, and realize less than 2d. per dozen bunches of twelve flowers. Under fairly good conditions from 40,000 to 50,000 bunches may be reckoned to the acre, and the gross receipts may be anything from £25 to £80. The cost of picking, bunching, packing, and marketing will come to about £15 or £20 per acre, whether the prices realized are good or bad, so that the net profits are difficult to gauge. Taking the average, however, the Poet's or Pheasant's Eye Narcissus may be regarded as a fairly good catch crop on land that is chiefly engaged in producing fruit. When the newer and finer varieties become more reasonable in price it may be worth the market grower's while to plant some of them on a larger scale. The true *poeticus* flowers about a month later than its variety *ornatus*. For special kinds and varieties the reader should consult current bulb catalogues.

Nasturtium.—Under this name several garden forms of *Tropaeolum majus* and *T. minus* are grown and sold in pots or boxes early in the year for bedding out. Being easily grown annuals the seeds are sown in any ordinary compost in February, March, or April, and the young plants are fit for sale in May and June. The tall, coarse-growing varieties of *T. majus* are not so much appreciated as the dwarfer forms, but they are very effective over arches, trellises, &c., in summer. Some of the best tall varieties are *King Theodore*, deep crimson; *Queen Alexandra*, blood red, variegated leaves; *Queen of Spain*, golden yellow with brown spots, and variegated leaves; *Vesuvius*, deep apricot; and many others in various shades. Amongst the dwarf or "Tom Thumb" section are *Golden Cloth*, scarlet, yellow leaves; *Empress of India*, intense crimson; *King*, brilliant scarlet; and many other fine varieties. There are also double-flowered forms with yellow and scarlet flowers; and a new dwarf "Liliput" strain, which form compact bushy plants smothered in bloom in a great variety of colours.

Nemesia strumosa.—This beautiful half-hardy South African annual

is now largely used for bedding out during the summer months, and also for greenhouse decoration. It grows 1-2 ft. high, has oblong, pointed leaves, and trusses of rich orange flowers in the type, but with shades of white, yellow, crimson, pink, orange, &c., in the garden forms. Seeds are sown chiefly under glass in spring.

Nemophila.—Popular and showy hardy annuals easily raised from seeds, in which florists do a fairly good trade in spring. Plants raised early in gentle heat, and pricked out into shallow boxes, also sell for bedding in early summer. There are several kinds, such as *insignis*, 1½ ft., with blue, white, purple, rose, and striped varieties; *Menziesi* (or *Atomaria*), 4-8 in., white or pale blue, speckled black, with several varieties; *maculata*, 6 in., white, with a violet-purple blotch on each corolla lobe; and *phacelioides*, pale blue, with a white centre.

Nepeta.—The variegated form of the common British Ground Ivy (*N. Glechoma*) is a very pretty trailing plant useful in the rock garden or border, or for hanging baskets. It has roundish leaves beautifully variegated with silvery white. It grows in almost any moist soil in somewhat shaded positions, and is readily increased by cuttings and division. *N. Mussini* is a straggling plant now used largely in places for carpeting the ground or as an edging. It is smothered with pale purple or blue flowers in June and July.

Nertera depressa (the BEAD PLANT or FRUITING DUCKWEED).—A remarkable New Zealand plant which forms dense tufts of small fleshy

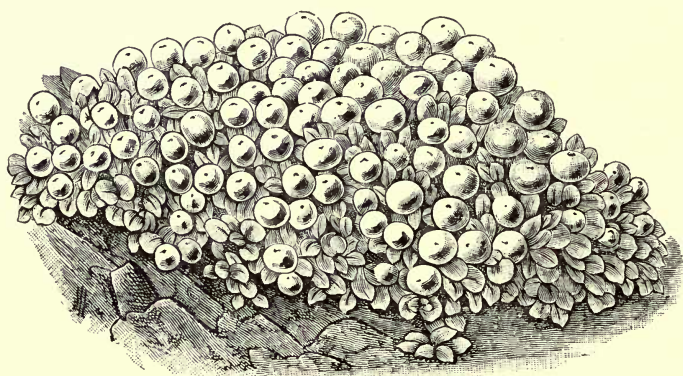


Fig. 227.—*Nertera depressa*

bright-green leaves, upon which numerous bright orange-red berries (fig. 227) about half the size of peas are seated after the minute greenish or pinkish flowers are fertilized. This plant is often sold as a curiosity when in fruit, and is also used for carpet bedding. It flourishes in a mixture of sandy loam and leaf mould, and likes plenty of moisture and sunshine. It is best grown for sale in small pots in light and airy green-houses, and is increased by division or from seeds.

Nicotiana (TOBACCO).—There are several species of Tobacco grown

largely for sale in spring and early summer. The most popular, however, are *N. affinis*, the white sweet-scented species, 2-3 ft. high, and the rose, pink, and purple-flowered hybrids under the name of *Sanderæ*, which have been raised by crossing *N. affinis* with *N. Forgeti*—the latter a Peruvian red-flowered species. *N. sylvestris* has large leaves and dense clusters of long-tubed sweet-scented flowers which remain open all day, unlike those of *N. affinis*, which are best in the evening. A fine Tobacco, having the large leaves marbled and blotched with creamy white and pale yellow, is *N. tomentosa*, better known as *colossea variegata*. It is an excellent plant for beds and borders, and is best raised from cuttings in spring inserted in sandy soil with bottom heat, but with the tops uncovered. *N. glauca*, with yellow flowers, *N. macrophylla* or *gigantea*, with pale-red flowers, *N. suaveolens*, white, and the Common Tobacco (*N. Tabacum*), with rosy flowers, are all worth attention. They are easily raised from seeds in gentle heat. In the milder parts of the kingdom, and especially in parts of Ireland, attempts have been made to grow *N. Tabacum* as an article of commerce. There is no doubt it could be so grown, and very fair profits might be made. The percentage of nicotine would probably be greater than in the real Havana Tobacco, but this would make the leaves more valuable from an insecticide point of view.

Nierembergia rivularis.—This South American perennial with drooping or creeping stems, spoon-shaped leaves, bell-shaped flowers 1-2 in. across, is a charming plant for growing in window boxes or pedestal vases. It flourishes in moist sandy soil, and may be increased by cuttings, seeds, or rooted portions of the stems. *N. frutescens* has narrow leaves and delicate blue or white flowers; and *N. gracilis* has long-tubed white blooms streaked with purple and with a yellow centre. The plants are raised from seeds annually in the same way as China Asters, Zinnias, &c.

Nigella damascena (DEVIL-IN-THE-BUSH; FENNEL FLOWER).—A pretty hardy annual 1-2 ft. high, with finely cut leaves and large white or blue flowers. There is a double-flowered form, and also a dwarf strain. *N. hispanica* is the "Love-in-a-Mist" (fig. 228), has white, purple, and deep-blue flowers. One of the best forms is "Miss Jekyll".



Fig. 228.—*Nigella*

Nolana atriplicifolia (*grandiflora*).—A beautiful trailing Peruvian hardy or half-hardy annual with hairy stems and blue funnel-shaped flowers with a white centre—pure white in the variety *alba*.

Nycterinia (or **Zaluzianskia**).—The best-known kinds are *capensis*, with narrow leaves and spikes of whitish flowers, and *selaginoides*, having white flowers with an orange centre. Both kinds are South African annuals, and are raised from seeds sown in heat in spring. *N. lychnidea* is a tender hairy perennial 6–12 in. high, with spikes of yellowish-white flowers in summer.

Ænothera.—A large genus, best known perhaps from the “Evening Primrose” (*Æ. biennis*), a North American biennial, 2–4 ft. high, with beautiful sweet-scented primrose-yellow flowers. The variety *Lamarckiana* or *grandiflora* is superior to the type. *Æ. Drummondii*, with grey-green wavy leaves and pale-yellow or white flowers, and *Æ. crassicaulis*, 1–1½ ft. high, with pure-white flowers, are both biennials, easily raised from seeds. *Æ. taraxacifolia* is another fine biennial from Chili, with long trailing shoots and white flowers with long tubes. *Æ. amœna* or *Lindleyi*—also known as *Godetia rubicunda*—is a fine annual 1–2 ft. high, having rose with a crimson spot on each petal. There are several fine varieties of it. *Æ. bistorta* has yellow flowers with deep-red spots at the base. There is an improved dwarf form called *Veitchiana*. *Æ. triloba* (or *rhizocarpa*) is another yellow-flowered annual. There are several others closely related to and confused with the *Godetias* (which see).

PERENNIALS.—Among the best perennial species of *Ænothera* the following are grown for sale: *fruticosa*, 2–3 ft., yellow, with a fine deep-coloured form called *Youngi*, and a semi-double one; *eximia* (*caespitosa*), 9–12 in., white; *glaucæ* and *Fraseri*, 2 ft., rich yellow; *glabra*, with crimson-tinted stems and leaves and yellow flowers; *Howardi*, trailing, with yellow flowers, changing to rich orange scarlet in hot situations; *missouriensis* (*macrocarpa*), trailing, with yellow flowers, 4–5 in. across; *speciosa*, 2–3 ft., white, with one or two fine varieties.

Omphalodes verna.—A pretty rock plant, 6 in. high, with trailing stems and deep-blue Forget-me-not-like flowers from March to May. The variety *alba* has white flowers, and later. It likes sandy loam, and is raised from seeds and by division.

Onosma echioides (*tauricum*).—A charming Caucasian perennial about 1 ft. high, with tufts of hairy lance-shaped leaves, and clusters of drooping golden-yellow flowers (fig. 229). Other kinds are *albo-roseum*, white; *bracteosum*, white; *pyramidale*, scarlet; and *stellulatum*, white or pale yellow. All kinds are propagated by cuttings of the basal shoots inserted in sandy peat in spring, and also by seeds.

Orchids, Hardy.—The development of open-air gardening has brought about a trade in many kinds of hardy terrestrial orchids, most of which are grown for sale in pots, and are used for the decoration of nooks in the rock garden or by the boggy banks of pools of water, being mostly grown in leaf mould or peat and sphagnum moss. The following kinds are in commerce: *Aplectrum hyemale*, a one-leaved orchid with rich-

Fig. 229.—*Onosma echioides* (*touricum*)

purple flowers, having a white lip tinged with crimson. *Bletia hyacinthina*, broad plaited leaves and brilliant rose-purple flowers, with a white variety. *Calopogon pulchellus*, leaves grassy, flowers bright purple with yellow and white hairs. *Calypso borealis*, bulbous, with heartshaped leaves and rose-purple flowers with a white lip, having a yellow crest and deep brown blotches. Cypripediums or Lady Slipper orchids, including *acaule*, *arietinum*, *Calceolus*, *californicum*, *candidum*, *guttatum*, *japonicum*, *macranthum*, *montanum*, *parviflorum*, *pubescens*, and *spectabile*. *Epipactis gigantea*, 3 ft., with loose racemes of purple and brown flowers; *latifolia*, white and purple; *palustris*, white, tinged with crimson, drooping; *rubiginosa*, reddish purple. *Goodyera Menziesi*, leaves mottled, flowers white, and *pubescens*, with netted leaves and white flowers. *Habenaria ciliaris*, *dilatata*, *Hookeri*, *obtusata*, and *psycoides*, all interesting orchids with fringed lips. To these may be added the various species of Ophrys, including the Bee Orchis (*O. apifera*), the Spider Orchis (*O. aranifera*), the Bumble Bee Orchis (*O. bombilifera*), and the beautiful spotted orchids *Orchis maculata*, *O. pyramidalis*, *O. latifolia*, *O. laxiflora*, &c. (see also p. 185).

Ostrowskya magnifica.—A magnificent Bellflower from Turkestan,

Fig. 230.—*Ostrowskya magnifica*

recognized by their lobed leaves. Some kinds are grown in greenhouses,

Fig. 231.—*Oxalis enneaphylla*

4-5 ft. high. It has large tuberous, Parsnip-like roots, circles of toothed leaves, and beautiful, bell-shaped flowers up to 4 in. across, white stained with lilac-purple and deeper veins (fig. 230). This noble plant is quite hardy in most parts of the kingdom, and may be raised from seeds sown in cold frames or in a warm greenhouse. Owing to the great roots it is necessary to have the soil deeply dug and well manured to secure the best results.

Ourisia coccinea.—A handsome Chilean rock plant about 9 in. high, with oval coarsely toothed leaves, and drooping scarlet flowers from May to September. It likes moist peaty soil, and partially shaded places and warm, being a little tender.

Oxalis.—A large genus of tuberous-rooted plants from various parts of the world, easily recognized by their lobed leaves. Some kinds are grown in greenhouses, but several are fairly hardy. Among these latter one of the best is *enneaphylla* (fig. 231), from the Falkland Islands, with tubular white (or rose) flowers in summer. It likes moist shady positions in the rock garden, and is increased by separation of the offsets. A closely related species is *adenophylla*, which has larger pink or rose flowers. *O. crenata* and *O. Deppei* are valued for their edible tubers, but there are about 200 other species having a general resemblance in blossom, the colours of which are either white, rose, or yellow.

Pæonia (PÆONY).—Although there are many distinct species of Pæony known in botanical collections, only one or two are grown extensively

for market. Indeed the species themselves are not grown at all, but the magnificent double-flowered forms that have been raised from them. These have emanated chiefly from *P. albiflora* (or *P. edulis*), a Siberian plant, 2-3 ft. high with beautiful white or pale-pink flowers; and from *P. officinalis*, a red or crimson species from South Europe. *P. corallina*, a crimson or rose-red form, naturalized in parts of Britain, and *P. peregrina*, bright crimson, both have had something to do with the production of the modern garden forms. What are known as Chinese Pæonies are derived from *P. Pottsi* and *P. Reevesi*, and the Anemone-flowered Pæonies are said to have come from *P. officinalis* and *P. paradoxa*.

These are all hardy herbaceous deciduous perennials, and are thus easily distinguished from the Tree or Moutan Pæonies (*P. Moutan*), a Chinese and Japanese species which has woody stems and large gorgeously coloured flowers having a wide range of colour from white to rose, salmon, lilac, scarlet, magenta, violet, &c. A newer kind, *P. lutea*, also from China, has yellow flower, and in the course of time we may expect the hybridist to utilize it for the creation of new varieties.

As market plants the herbaceous Pæonies are now grown extensively in some Middlesex market gardens, chiefly for cut flowers. They are planted beneath standard and half-standard Apple, Pear, and Plum trees about 2 ft. apart every way, thus giving about 8000 plants to the acre,

after allowing for the trees and pathways. The plants like a good, rich and well-manured soil, and, once established, flower profusely year after year. A good plant will average a dozen fine flowers per annum, so that 80,000 to 100,000 blooms per acre may be taken as a fair crop. At 3d. per bunch of twelve flowers this means a gross yield of £100 to £125 per acre. Sometimes, however, there are enormous quantities sent to market, the bunches being simply taken up loose in van loads, and the prices may then average only 1d. per bunch. Only a few kinds—the deep-crimson, the white, and a deep-rose variety—are grown in market gardens, but there are now so many lovely shades of rose and pink that the

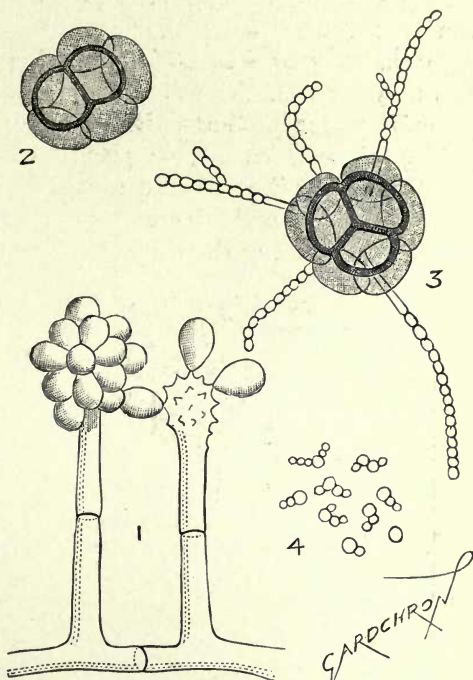


Fig. 232.—Pæony Drooping Disease (*Sclerotinia pæoniæ*)

1, Summer form of fruit (magnified 400). 2, Minute black sclerotia formed in dying leaf-stalks close to the ground. When the leaf-stalk decays these sclerotia rest in the soil until the following spring, when they produce spores as shown in fig. 3, which infect the young leaf-stalks as they push through the soil (magnified 100). 4, Spores produced by sclerotium germinating in the soil (magnified 100).

market grower might well consider them. The cultivation is simple. So long as the soil is good, a little manure added in autumn or winter will give sufficient nourishment to the roots; and as the leaves and stems—weighing from 6 to 8 tons per acre—are allowed to die down and rot, they may be regarded as a natural annual dressing of manure. It would therefore be hard to find a crop more economic to cultivate than the herbaceous Pæony.

The best time for planting Pæonies is about August or September, taking care not to injure the tuberous roots and fleshy shoots more than can be helped.

Pæonies in market gardens are singularly free from disease. Nevertheless they are sometimes subject to attack from a fungus called *Sclerotinia pæoniæ*, which produces the drooping disease. The fungus attacks the young crimson, bronzy, or purple growths in spring and destroys them very soon. In large areas spraying is almost out of the question, and the best plan would be to take up the affected plants and burn them, afterwards dressing the soil with flowers of sulphur. Fig. 232 shows what the Pæony disease is like.



Fig. 233.—Fancy Pansy

Pansy.—Originally derived from *Viola tricolor*, the Pansy has been enormously improved and vastly increased in size. At one time, more particularly in northern districts, societies existed to further the claims of the flower, and the show and fancy varieties were then seen to perfection. To-day a large number of the fancy sorts (fig. 233) are raised from seeds, and the strains of such as *Trimardeau*, *Parisian*, *Masterpiece*, *Ne Plus Ultra*, and others realize good prices. It is largely the varieties of the two first-named strains that figure so prominently in our flower markets in spring, whither they are brought when in flower.

Their cultivation differs in no essential particular from that of their tufted namesake, the two being likeminded as to soils. Cuttings, however, never appear in the same abundance or profusion on Pansies, and unless the plants are required to produce seeds they should be early cut back to induce the formation of a good and suitable cutting growth.

Seeds of any of these fancy sorts may be sown in July, preferably in boxes or pans, so that the seedlings may be cared for in the usual way.

Thus treated the seeds soon vegetate, and the seedlings, having been given the shelter of a cold frame, may in September be transferred to the open nursery beds. Seeds may also be sown in heat in January and February. The young plants should be pricked out into shallow boxes when large enough to handle, and later on may be placed singly in 3-in. pots or planted out 4 in. apart in frames. They will be in bloom by the middle of May and early June, and are then fit for sale in pots, or with the roots wrapped in hay or moss. [E. H. J.]

Papaver.—This genus comprises the various kinds of Poppies—annual and perennial. The Iceland Poppy (*P. nudicaule*), a native of Siberia and North America, is the finest of all for market. Although really a perennial it is treated as an annual or biennial. The seeds are sown in April and May, and the young plants are pricked out and afterwards transplanted by September about 1 ft. apart. There are several varieties, but the tallest are the best for selling. The flowers have white, yellow, orange, &c., shades, and if cut before open they last well. Large quantities are grown for market, the flower stems being cut as long as possible and stood in water a few hours before they are packed for market.

The Oriental Poppy (*P. orientale* and its variety *bracteatum*) is a true perennial, is quite hardy, and produces large crimson-scarlet flowers in early summer. The plants are best raised from seeds, and will flourish in any garden soil.

P. pilosum from South-east Europe is a handsome perennial Poppy, 1-2 ft., with pale-scarlet to deep-orange flowers. There are several fine hybrids between this and other species, the flowers having many shades of colour.

The "Shirley Poppy" is said to be a form of the common Corn Poppy (*P. Rhæas*). It has lovely blooms of all shades of delicate colour except blue. The trade is usually in the seeds in spring. These are best sown in March where the plants are to bloom, the seedlings to be thinned out to 9 in. apart.

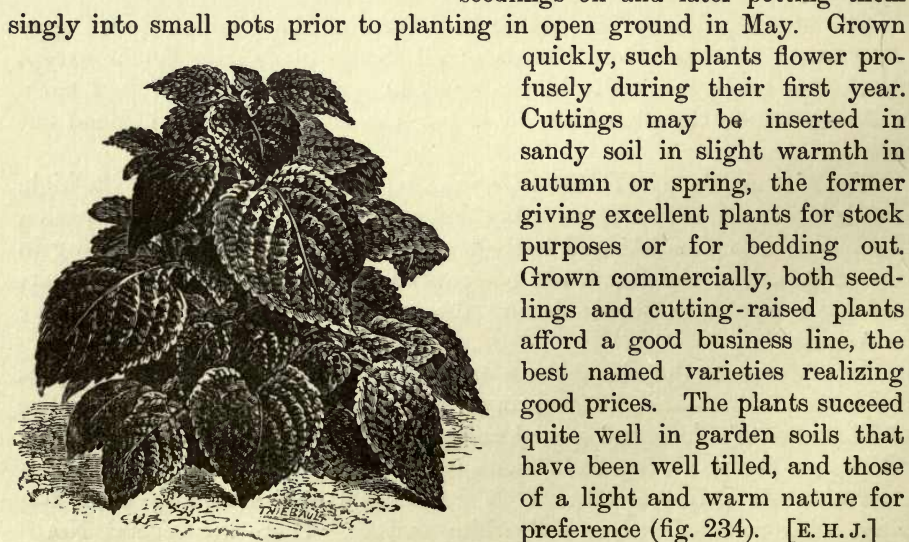
The Opium Poppy (*P. somniferum*), a beautiful annual, 3-4 ft. high, with white, rose, or lilac flowers, is chiefly grown for the heads or capsules, that are sold to chemists and herbalists. The seeds are sown in spring in rows 2 ft. apart; the plants are afterwards thinned out about 1 ft. apart and kept free from weeds during the summer. The capsules are ripe in August.

In addition to the above there are numerous kinds of garden Poppies, the seeds of which are sold in spring. There are single and double varieties of all shades of colour, and special names like the "Danebrog", the "Tulip", "Japanese Pompon", &c., have been given to some of them.

Parnassia palustris (GRASS OF PARNASSUS).—A charming little bog plant with rounded leaves and white flowers. There are several North American species and *nubicola* from the Himalayas, all very similar in appearance. They like damp peaty soil, and are increased by division and from seeds.



Fig. 234.—Garden Pentstemon

Fig. 235.—*Perilla nankinensis*

Paronychia argentea (NAILWORT).—This forms dense compact green and silvery patches; and *P. serpyllifolia*, with trailing stems and masses of small thyme-like leaves, make good carpet plants.

Pentstemon.—The hybrid Pentstemons of to-day had their origin in *P. Hartwegii* or *P. gentianoides* and *P. Cobaea*, both natives of North America. They are plants of great garden value and ornament—valuable because of their colour warmth and for their late summer and autumn flowering. To florists generally, and to northern florists in particular, we are indebted for the high-class strains which now obtain, the crimsons, scarlets, and reds generally being most effective in late summer. As the plants do not possess the attribute of complete hardiness, they must be raised from seeds or cuttings. Sow the seeds in January or February in the greenhouse, subsequently pricking the seedlings off and later potting them

singly into small pots prior to planting in open ground in May. Grown quickly, such plants flower profusely during their first year. Cuttings may be inserted in sandy soil in slight warmth in autumn or spring, the former giving excellent plants for stock purposes or for bedding out. Grown commercially, both seedlings and cutting-raised plants afford a good business line, the best named varieties realizing good prices. The plants succeed quite well in garden soils that have been well tilled, and those of a light and warm nature for preference (fig. 234). [E. H. J.]

Perilla nankinensis (fig. 235).

—A distinct half-hardy annual, with heart-shaped ovate deep-purple strongly veined leaves, which con-

stitute the chief feature of the plant for bedding purposes. Seeds are sown best in cutting boxes about February, the young plants being afterwards pricked out about 3 in. apart in similar boxes or placed separately in 3-in. pots. A good trade is done in May and June, after which the remnants are generally thrown away. The best varieties are *macrophylla compacta*, with very large deep-coloured leaves; and *atropurpurea laciniata*, very deep colour with cut margins.

Phlox.—This genus contains annual and perennial varieties. *P. Drummondii* and its numerous varieties are usually grown as half-hardy annuals, but they may also be sown in the open ground in March to flower during the summer months. Florists and seedsmen usually sell large quantities of seed in spring. Growers raise the plants in shallow boxes, and sell them from April to June for bedding purposes. The *grandiflora* forms are very popular, but there are others, such as *alba*, white; *carnea*, flesh; *oculata*, white with purple eye; *Leopoldi*, scarlet, white eye; *cuspidata*, starry petals; *nana compacta*, with blue and carmine forms.

HERBACEOUS PHLOXES.—These charming border perennials, grown so largely, are known under the names of *P. decussata* and *P. suffruticosa*, the first being the tall late-flowering varieties, the second the dwarfer early-flowering ones. The tall kinds are descended from hybrids of *P. paniculata* and *P. maculata*—both natives of the United States, and both very variable, judging by the many names under which they are known to botanists.

Garden Phloxes flourish in any good garden soil, but the richer it is the better the results. The clumps should be planted about 2 ft. apart every way, and a cool or partially shaded position will suit them better than one fully exposed to the glare of the midday sun, as the flowers and leaves are very susceptible to strong sunshine. The plants may be increased by dividing the rootstocks in early autumn, and planting out each rooted portion with a dibber. Cuttings of the young shoots about 2 in. long may also be inserted in sandy soil in cold frames in spring, or on a gentle hotbed. Root cuttings of special varieties may also be employed to increase the stock if necessary, the cut portions being placed about 1 in. deep in sandy soil on a hotbed. Seeds of Phloxes may also be sown in gentle heat in spring, or in the open air in April or May, but they are slow and erratic in germinating. Particularly fine varieties cannot be increased in this way, as they would probably produce a very mixed result (fig. 236).

Wherever the soil is deeply dug or trenched and well manured, Phloxes will flourish for several years until they become too crowded. Each autumn a top-dressing of well-rotted manure should be given, and in spring the soil between the rows should be lightly pricked up with an old fork. A dressing of basic slag just before this operation will be beneficial at the flowering period. It will also check any acidity due to too much manure, and prevent the disease that often overtakes the plants. Julius worms or millipedes sometimes play havoc with the roots in badly aerated soils. In such cases the plants should be transferred to another spot, where the soil

has been trenched and cleaned, or they may be returned to the same soil after these operations have been performed. For market purposes Phloxes are chiefly valuable for cut flowers during the summer months, but the rootstocks also sell in spring. There are numerous varieties, but none sell so well as the pure-white varieties. Some of the best of these are: Avalanche, Purity, Sylphide, La Neige. There are several other whites, having,



Fig. 236.—Garden Phlox

however, a pink, rose, or purple eye, and others again flushed with rose, lilac, mauve, purple, &c. There are also varieties with almost uniform colours of pink, rose, carmine, salmon, and scarlet, but market growers confine themselves to one or two they fancy most. A good trade, however, is done by nurserymen in most of the garden Phloxes, the plants being usually sold in small pots at prices that would make the market grower's eyes glisten.

Besides the garden Phloxes of the *decussata* and *suffruticosa* sections a limited trade is done in plants for borders and rock gardens, some of the most popular kinds being: *amœna*, 6–9 in.,

purple, pink, white; *canadensis*, bluish grey, white; *divaricata*, 1 ft., soft blue, with a white variety; *ovata*, rose; *procumbens*, grey blue; *reptans*, rose purple or violet; *stellaria*, white; *subulata*, pinkish purple, with several varieties, including one called *setacea*, and another *lilacina*, mauve.

Phormium tenax (NEW ZEALAND FLAX).—An ornamental plant 3–8 ft. high, with broad sword-like leaves which in some varieties assume tints of red and purple, while another is striped with creamy white and yellow. It is hardy in the milder parts of the kingdom, and is used for subtropical effects. A rich, loamy soil is best, and propagation is effected by division, and also by seeds when obtainable.

Phygellus capensis.—A fine South African perennial, 3 ft. or more high, with pyramidal spikes of drooping tubular scarlet flowers. In the mildest parts of the kingdom it forms a bush or shrub. Fresh stock is secured from seeds, cuttings, and by division.

Physalis.—For many years *P. Alkekengi*, a European perennial, had been grown for its red, inflated calices, but it has been completely driven out by the Japanese *P. Francheti*, the calices of which are two or three times larger, and of a bright orange-scarlet colour, enclosing a large cherry-like fruit. They are chiefly valuable for winter sale and decoration. The plants grow in any soil, but produce the finest colour in open, sunny spots. Easily raised from seeds or by division; the plants are popularly known as "Chinese Lanterns" (fig. 237).

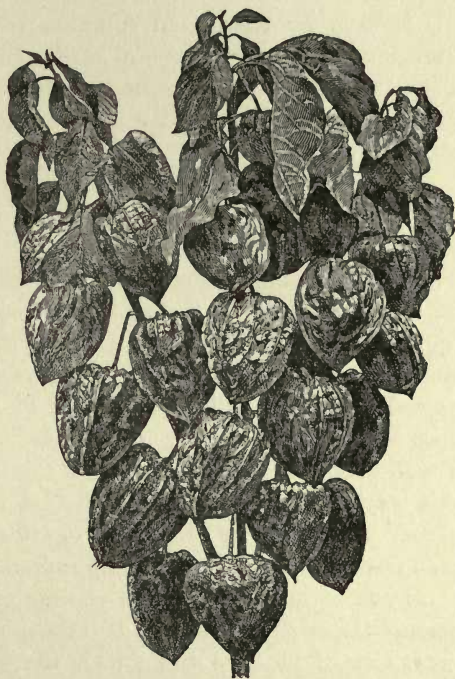


Fig. 237.—*Physalis Francheti*

Phyteuma (HORNED RAMPION).—A genus of rock and border plants requiring a mixture of sandy loam and peat or leaf mould, and best increased from seeds. The best kinds are: *anthericoides*, 9 in., slaty blue; *comosum*, 3–6 in., blue; *Sheuchzeri*, 1 ft., deep-blue round heads; *spicatum*, 1–3 ft., with white, cream, and blue varieties. The flowering period is from June to August.

Platystemon californicus.—A pretty Californian Poppywort, 1 ft. high, with narrow leaves and long-stalked yellow flowers. It is treated as a hardy or half-hardy annual.

Podophyllum Emodi.—A curious Himalayan perennial, 6–12 in. high, with deeply lobed leaves marbled with purple, and white flowers followed by bright coral-red berries. Other kinds are *peltatum*, 6–12 in., with large poisonous leaves; and *pleianthum*, 1–2 ft., from China. They like moist peaty soil and sheltered spots, and are best raised from seeds.

Polemonium cœruleum (JACOB'S LADDER).—An easily grown hardy herbaceous perennial, with 6–12 pairs of ovate leaflets that give a Fern-like aspect to the plant. The blue or white flowers appear in summer. There are several varieties, one *dissectum*, with finely divided leaves, and another—*variegatum*—has beautifully variegated leaves. The trade done is chiefly in the plants, and by nurserymen rather than market growers.

Polyanthus (*Primula variabilis*).—The Polyanthus as we know it to-day—in primrose and cream and white, sulphur and gold and orange,

crimson and red and allied shades—has been gradually evolved from the above-named hybrid, itself the result of crossing *Primula acaulis* and *P. officinalis*. It is one of the most popular of spring-flowering plants, an old-time favourite, whose popularity is not a little due to perfect hardiness, great freedom of flowering, and simplicity of culture. The plants delight in rich soils and cool and shady spots; hence it is a success in orchard and woodland, or in soils where much moisture is found.

Though by nature, in common with its original parents, of perennial duration, it is for effective garden decoration far better if regarded as a biennial only, to be raised periodically from seeds. Seedlings, indeed, possess the greater vigour and provide that freedom of flowering everywhere admired.

The seeds should be sown in March or April in shady spots in the open, or in boxes or pans in frames, and be transplanted when three or four leaves have been formed. Not a few amateur and private gardeners postpone the sowing of the seeds to August, or even later, evidently working on the new seed-crop theory. Seeds sown at this latter date, while vegetating early and well, cannot overtake those sown a few months' earlier, and since size of plant in this instance means also a great flowering, the period named should be followed. Seeds of *Polyanthus* are most impatient of a deep soil covering. Far better that the seeds be thinly broadcasted on a well-prepared bed of soil, well watered in, and left alone to nature. In this way they are washed into the interstices of the soil and require nothing more. Rich food or abundant moisture, or their partial equivalent, shade, are essential to success, their opposites but court failure by starvation.

Seeds of many high-class strains are available at the present time, and among these the "Munstead" strain calls for special mention because of great size of blossom and a wide range of colours. A point of importance to the grower of this crop is the ever-present need for further improvement, best accomplished by cross-breeding, selection, and re-selection, which naturally includes the elimination of the degenerates. A profitable crop, of which the seeds and the plants are alike saleable. The *Polyanthus* is a great favourite with some market growers, who plant it between the rows of standard Apples, Pears, or Plums, about 1 ft. apart, or less, and sell the "roots" in boxes in the spring. Forty thousand plants to the acre may be taken as a fair crop.

[E. H. J.]

Polygonatum.—Besides the Solomon's Seal (see p. 100) there are a few other kinds, such as *biflorum*, 1–3 ft.; *japonicum*, 1–2 ft.; *latifolium*, 2–4 ft.; *officinale*, 1 ft.; *oppositifolium*, 2–4 ft.; *punctatum*, 1–2 ft.; and *verticillatum*, 2–3 ft.—all with greenish-white flowers. *P. roseum* has pinkish blooms.

Polygonum (KNOTWEED).—A large genus of vigorous-growing plants chiefly dealt in by hardy-plant growers. The best-known member of the genus is the beautiful Japanese knotweed (*P. cuspidatum* or *Sieboldi*) which grows 6–10 ft. high, has large heart-shaped leaves and trusses of white flowers in summer. This plant flourishes in any spot and in any

soil, but is generally treated as a rank weed, notwithstanding its natural beauty. The old hollow stems make excellent traps for catching earwigs on Dahlias, &c.

P. baldschuanicum, a climbing species from Turkestan, with woody stems 10 to 20 ft. long, and fleecy masses of small white flowers. The chief trade is done by nurserymen, who have propagated it in thousands during the past ten or fifteen years. Several other fine *Polygonums* are grown, the best being *alpinum*, 3 ft., white; *affine* (*Brunonis*), 6 in., rose; *amplexicaule*, 2-3 ft., rose red; *Bistorta*, 1-2 ft., rose pink; *compactum*, 2-4 ft., white; *filiforme variegatum*, 2-3 ft., the leaves of which are blotched and streaked with yellow and cream; *lanigerum*, 6-10 ft., deep red; *multiflorum*, white, tuberous rooted, climber; *sachalinense*, 10-12 ft., greenish white; *sphærostachyum*, 3-5 ft., blood red; *vaccinifolium*, rose, trailer, &c.

Portulaca grandiflora (SUN PLANT).—A beautiful Brazilian plant about 6 in. high, having cylindrical leaves with tufts of hairs in the axils and crimson-purple flowers in crowded clusters. There are several varieties with flowers of different colours. The plants are raised from seed sown in heat in spring, and are planted out in the hottest and sunniest places in summer to secure the full opening of the flowers.

Potentilla.—The garden kinds are now largely grown, and are the progeny of the Himalayan species *argyrophylla* and *nepalensis*. They all flourish in ordinary well-drained garden soil, and are increased by division and from seeds. There are several good species in cultivation, but they cannot compete in popularity with the brilliant single and double hybrid varieties of which the following is a selection:—

Yellow flowered: Arc-en-ciel, Californie, chromatella, Drap d'Or, Fantaisie, Golden Cup, Goldfinch (single), Gold Kugel, Gold Prince, Melpomene, Milton, Mont d'Or, Nerissa, Orphee, Phcebus, Van Dyck, Vase d'Or.

Red, crimson, and scarlet flowered: Capella, Le Dante, Louis van Houtte, Madame Rouillard, Magnet (single), nigra plena, Ophir, sanguinea (single), Toussaint L'Ouverture, Vulcan, Zingari.

Various colours (red and yellow): Brunette, Don Quixote, Dr. André, E. R. Cutler, Golconde, Lamarque, Le Vesuve, Milton, Panorama, William Rollisnon, &c.

Primrose (*Primula vulgaris*).—The common British Primrose can hardly be said to be cultivated for market, although thousands of bunches of blossom are sold every April. The blooms are picked by countryfolk in the woods and sent up by agents to the salesmen. Florists and street sellers do a good trade in the blooms for the time being.

A trade also is done in the plants in early spring and autumn, together with the Cowslip (*P. veris*) and the Oxlip (*P. variabilis*). The "blue" Primroses, raised by the late Mr. G. F. Wilson, of Weybridge, are dealt in by hardy-plantsmen, and are valuable for rock gardens, woodlands, &c.

Primula.—A large genus of hardy and half-hardy plants, some

members of which have been described under separate headings, viz.: the Primrose (*P. vulgaris*), the Chinese Primrose (*P. sinensis*), and *P. obconica*; the Auricula (*P. Auricula*); the Polyanthus (*P. variabilis*). Apart from these there are over 150 species, natives chiefly of the mountains of Central Europe, the Himalayas, China, and Japan, and it is possible that there are many more waiting to be discovered. The great majority are so scarce that they can never hope to be found outside botanical collections. For detailed particulars of most of them the reader is referred to the *Practical Guide to Garden Plants*, pp. 604 to 618.

Amongst those in which a trade is done at present the following may be mentioned:—

1. *Primulas that will grow in ordinary good garden soil in partially shaded places:*

Beesiana, flowers in tiers, rich velvety purple with yellow eye; *Bulleyana*, flowers closely set on stems 18 in. high, golden yellow suffused with deep orange outside; *cortusioides*, rose purple with several varieties; *denticulata*, globular heads of lilac flowers; white in the variety *alba*; *Forresti*, flowers canary yellow, fragrant, resembling a large cowslip, and borne on stems 15 in. high; *lichiangensis*, purple crimson, in the way of *cortusioides*; *Littoniana*, a striking plant with rosettes of silvery leaves, and rosy lilac flowers borne in pyramidal spikes 1½ ft. high, reminding one very much of *Orchis pyramidalis*; *Poissoni*, deep purple with bright-yellow eye; *Sieboldi* (or *amæna*), in the way of *cortusioides*, with deep-rose flowers, varying in different varieties to lilac, lavender, mauve, pale blue, &c.; *Veitchi*, flowers pink to rose.

2. *Primulas that like moist shady spots and a soil rich in humus and old mortar rubble:*

Cockburniana, flowers orange scarlet in whorls on slender stems; *Allioni*, mauve; *Arctotis* (a cross between *Auricula* and *viscosa*), with white or lilac flowers; *calycina*, rose purple; *capitata*, rich violet purple, not quite hardy; *carniolica*, blue with white centre; *farinosa*, leaves mealy, flowers pale lilac, yellow centre; *frondosa*, leaves mealy, flowers rose lilac; *glutinosa*, flowers rich purple in dense heads; *hirsuta*, rose purple; *integrifolia*, purple rose; *marginata*, leaves with whitish margins, flowers violet rose or pale purple; *Maurettiana* (a hybrid between *integrifolia* and *viscosa*), with dense heads of deep-purple flowers; *megasæfolia*, distinct foliage, and flowers of crimson purple; *minima*, rose with white centre; *pubescens*, a hybrid with rosy-crimson flowers and yellow centre; *spectabilis*, fleshy leaves and deep rose-purple flowers; *viscosa*, leaves clammy, flowers rose purple with white centre, &c.

3. *Primulas requiring damp positions and a leaf mould compost:*

Pulverulenta, foliage mealy, flowers rich blood crimson; *involucrata*, leaves bright green, flowers creamy white; *japonica*, a magnificent species with tufts of leaves 6–12 in. or more long, and flowers in several whorls on stems 2–3 ft. high, deep crimson, rose, purple to white according to variety; *luteola*, flowers in round heads, drooping, pale yellow; *Parryi*,

bright purple with a yellow centre, from the Rocky Mountains; *rosea*, bright rose carmine (fig. 238); *sikkimensis*, a fine species with heads of drooping yellow cowslip-like flowers.

4. *Primulas* for a cool house or cold frame:

Floribunda, flowers golden yellow, very free, easily grown; *malaoides*, a new species, like *Forbesi*, but more compact, easily raised from seeds, flowers clear rose lilac, very popular amongst florists; *Forbesi*, loose habit, flowers rose lilac, very free; *kewensis*, a fine hybrid between *floribunda* and *verticillata*, with tiers of bright-yellow flowers. *P. Winteri*, a new species with flat rosettes of broad mealy leaves and stumpy trusses of pale to deep-mauve flowers.

Prunella grandiflora.—A pretty European rock plant, 6–9 in. high, with erect trusses of rich-violet flowers from June to September.

There is a white variety, and one (*Webbiana*) with bright, rosy-purple blooms. They grow in ordinary garden soil, and are increased by division and seeds.

Pulmonaria.—This genus has a few good plants, among the best being *angustifolia*, 1 ft., with pinkish and blue flowers; *arvensis*, deep blue and white; also *officinalis*, red turning to violet; *saccharata*, with spotted leaves and red flowers. They are all about 1 ft. high, and flower from March to July. Ordinary soil and shaded places are suitable, and they are increased by division and seeds.

Pyrethrum, Double- and Single-flowered.—Few hardy border perennials have enjoyed a greater run of popularity than the double- and single-flowered varieties of *Pyrethrum roseum*. Botanically, however, *Pyrethrum* is now included under *Chrysanthemum*, where our old-time friend figures as *C. coccineum*. The wild species—the progenitor of the present lovely race—belongs to the Caucasus, where it is virtually and practically an Alpine of a few inches in height. The numerous varieties which now beautify our gardens have been evolved during the past fifty years or so (fig. 239).

The plants are valuable in the border by reason of their early summer gaiety and profuse flowering, and alike valuable—the single-flowered sorts more particularly—in the cut state by reason of brilliant or delicate colouring and general comeliness. Because of their great length of stem and graceful heads of flowers the florist decorator regards them as ideal; and



Fig. 238.—*Primula rosea*

the flower that is in demand by these latter is the flower for the commercial gardener to produce, and that in quantity. The great vases of the flowers seen in the windows of leading florists are as a free advertisement, and, while well merited, tell a tale that the producer of flowers cannot afford to ignore.

CULTIVATION.—The *Pyrethrum*, more so than the majority of hardy perennial border flowers, requires to be dealt with from the cultural standpoint in a systematic manner, albeit, generally speaking, it is not fastidious. The plant itself is of tufted growth, its rootstock being made up of numerous crowns, often a hundred or more to a single clump. It happens, too, that the plant readily submits to division, the spade, the crudest of all implements, being often requisitioned for the purpose. No success worthy of the name has, however, ever followed this practice, and it is cited here as an instance of what *not to do*.



Fig. 239.—*Pyrethrums*, single and double

There are two seasons in the year when the plants may be lifted and divided with advantage—the early spring, when the new leaf growth is a few inches high, and again, in July or early August, when the plants, having got over their flowering, are seen to be pushing a new leaf growth. At either season the plants may be lifted, washed free of all soil in water, and divided up freely. Old flowered plants are best if placed on their sides on the potting bench, the clumps being wrenched asunder by hand assisted by the

point of a knife, or, better still, by placing two small hand forks back to back, and pressing each in an outward direction. By repeating the process a clump is readily reduced to small units—single crowns if you will—and so long as each portion is possessed of root fibres it is capable of making a good plant. Indeed these single-crown portions make the best plants and yield the finest flowers in their season. When divided in this way the plants require potting singly, and the protection of a cold frame for a few weeks before being again planted out.

GENERAL TREATMENT.—The *Pyrethrum* being naturally of a voracious appetite the soil cannot be too well enriched or too deeply cultivated. In growth the plants delight in abundant supplies of moisture. Where comparatively light soils obtain, the surface of the beds should be kept at

ground level, or rather below, and not raised. Where space permits, those permanently planted should be set out 2 ft. asunder. In respect of soils, avoid the more sandy and those of a tenacious water-holding character. In planting, keep the crowns level with the soil, to bury them would be wellnigh fatal to the plants. On heavy and retentive soils a small black slug is most destructive to the crown growth, to which a sprinkling of soot now and again or fine coal ash is a useful deterrent. The raising of these plants from seeds is a matter deserving attention.

VARIETIES.—Singles: *Gloire de Nancy*, pink; *Cervantes*, rose; *Hamlet* and *Monarch*, clear pink; *James Kelway*, scarlet; *Jubilee*, crimson; and *Mrs. Bateman Brown*, reddish crimson, the largest of its race.

Doubles: *Ne Plus Ultra*, blush; *Aphrodite*, *Carl Vogt*, *Princess de Metternich*, and *Mont Blanc*, white; *Alfred Kelway*, crimson; *J. N. Twerdy*, reddish amaranth; *La Vestale*, blush white; *Solfaterre*, *Vance*, and *Pericles*, yellow shades; *Captain Nares* and *Mons. Barral*, crimson shades.

[E. H. J.]

Pyrethrum aureum.—This is the well-known "Golden Feather" or "Feverfew", still grown in hundreds of thousands annually for bedding out and carpet-bedding work. It is valued for the bright golden yellow of its leaves, and its dwarf dense growth. There are many varieties, some being more saleable than others; among them may be mentioned "selaginoides", the "Golden Curled", the "Golden Moss", and "laciniatum". The seeds are sown in shallow boxes of gritty sifted soil about January or February in a temperature of 65° F. They soon germinate, and when the seedlings are large enough to lift with a pointed stick they are pricked out into similar boxes (15 in. by 9 in. by 2 in.) in any ordinary compost, each box holding from 90 to 100 plants. They are gently watered, and grown on in heat until well established, the boxes being placed as close to the glass as possible to secure the maximum amount of light. About April a cooler place is given to harden them off, such as in frames, and by early May the sale commences, the prices perhaps starting at 1s. per box and coming down to 6d. by the end of the season.

P. Parthenium.—This is the Common European Feverfew, which grows about 2 ft. high, and has deeply cut, lobed and toothed leaves, and white flowers with yellow centres, in summer. The double variety (*flore pleno*) is grown in some market gardens for cut flower. There are other forms with double flowers, the best being *eximia*, pure white, rounded; *grandiflora*, and *pyramidalis*. The plants are best raised from cuttings sheltered in a cold frame during the winter months, and planted out in March or April. They may also be increased by dividing the tufts. *Matricaria inodora flore pleno* (which see) is a closely related plant.

Ramondia pyrenaica (fig. 240).—A pretty Pyrenean perennial with flat rosettes of hairy ovate wrinkled leaves and flattish purple flowers in May and June, on stalks about 4 in. high. There is also a white-flowered variety. Other species are *Heldreichi*, and *serbica*, yellow. They are excellent rock plants, requiring peaty soil, and may be increased from

seeds and by division. New plants may also be obtained from leaf cuttings inserted in leaf mould or sandy peat in a close frame.

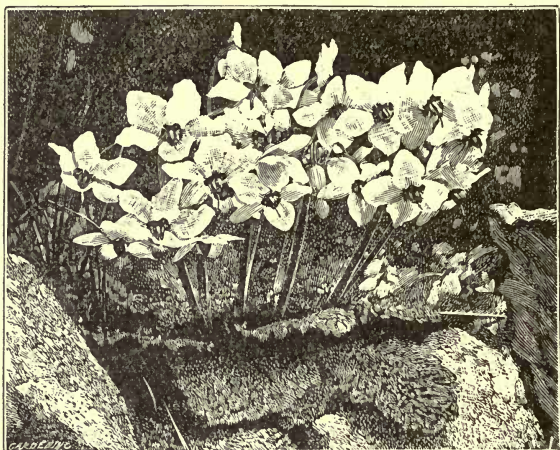


Fig. 240.—*Ramondia pyrenaica*

Ranunculus.—Of the many species known, only two or three are cultivated occasionally for market. The double-flowered variety of *R. aconitifolius*, with pure snow-white flowers popularly known as “White Bachelors’ Buttons”, “Fair Maids of France”, and “Fair Maids of Kent”, is one; and the double-flowered variety of the Common Buttercup, *R. acris*, is the other. The latter has beautiful golden-yellow flowers. Both kinds grow 12–24 in. high, and will flourish in any damp garden soil. They are easily increased by division in autumn, and the flowers sometimes sell well. There is also a double-flowered variety of *R. bulbosus*.

The Asiatic, Turkey, and Persian Ranunculuses (varieties of *R. asiaticus*) have tuberous fanged roots, and produce fine double flowers of various shades of orange, yellow, rose, pink, purple, and intermediate shades. Although very popular in private and public gardens, they are not generally grown for market in the British Isles, probably owing to the fact that the blooms are imported in thousands early in the year when they cannot be had in the United Kingdom, and later on the competition of other home-grown produce would render the cost of cultivation, &c., unremunerative.

Nurserymen do a limited trade in certain species of *Ranunculus* for borders and rock gardens, among the most important being *alpestris*, 3–6 in., white; *amplexicaulis*, 3–12 in., white; *cortusae-folius*, 3–5 ft., yellow; *Lyalli*, 2–4 ft., white; *gramineus*, 6–12 in., yellow; and *montanus*, 6–8 in., yellow.

Rehmannia angulata (elata).—A distinct-looking Chinese perennial, 3–6 ft. high, with somewhat triangular coarsely toothed leaves, and large bright rose-red Foxglove-like flowers drooping from an erect spike, and speckled or blotched with purple, and tinted with yellow in the throat.

R. chinensis (or *glutinosa*), 1-2 ft., is another species not so well known, with dull-purple flowers striped with deeper tints. Both kinds are best treated as half-hardy annuals or biennials, and are raised from seeds sown in heat in spring. Another species is *Henryi*, 12-18 in. high, with yellow and white flowers spotted with red. Hybrids have been raised between *chinensis* and *Henryi*, and also between the latter and *angulata*.

Rheum (RHUBARB).—There are several species of Rhubarb distinguished for their bold and ornamental foliage and huge plumes of blossom. They all flourish in rich soil, but will do well in almost any garden soil that is dug and manured. They are chiefly valuable for wilder parts of large parks and gardens and by the sides of lakes, streams, &c., in the same way as the Gunneras, which are often mistaken for them. The best Rhubarbs are *acuminatum*, 3 ft.; *australe*, 6-10 ft.; *Emodi*, 6-10 ft.; *nobile*, 3-5 ft.; *officinale*, 8-10 ft.; *palmatum*, 5-8 ft., of which there are several varieties, including *tanguticum*, *flore-roseo*, and *rubrifolium*. These are all natives of the Himalayas, Tibet, &c., and are easily raised from seeds and by division of the rootstocks.

Ricinus communis (CASTOR-OIL PLANT).—An ornamental tropical plant largely grown as a half-hardy annual for bedding-out purposes during the summer months. The plants are valued for the large, lobed, and ornamental leaves, which assume tints of bronze and purple during the season, and give a subtropical effect. The best varieties are *borboniensis*; *Duchess of Edinburgh*; *Cambodgensis*, nearly black; *Gibsoni*, deep maroon; *sanguineus*, with red stalks; and *zarizibarensis*, of which there are several forms.

Rochea (Crassula) falcata.—This and *R. perfoliata*, both with fleshy leaves covered with a glaucous bloom, are often used in carpet bedding as dot plants over a carpeting of dwarfer plants. Raised from cuttings.

Rock Garden and Alpine Plants.—The trade in these plants is now enormous. It would be impossible within the scope of this volume to go into details of every species and variety grown for sale, although the most important will be found described in their proper places. It may be well, however, to indicate in a special group by themselves the various genera from which the most noteworthy rock and alpine plants are derived, as follows:—

Acæna.	Anthemis.	Astrantia.	Claytonia.
Acantholimon.	Antirrhinum.	Atragene.	Conandron.
Achillea.	Aquilegia.	Aubrietia.	Coptis.
Adonis.	Arabis.	Calamintha.	Coriaria.
Æthionema.	Arenaria.	Calandrinia.	Coronilla.
Ajuga.	Armeria.	Campanula.	Cortusa.
Alchemilla.	Arnebia.	Cerastium.	Corydalis.
Alyssum.	Arnica.	Chamælrion.	Cotula.
Androsace.	Asarum.	Cheiranthus.	Cyclamen.
Anemone.	Asperula.	Chimaphila.	Dianthus.
Antennaria.	Aster.	Chrysobactron.	Draba.

Dryas.	Hutchinsia.	Enothera.	Saponaria.
Edraianthus.	Hypericum.	Omphalodes.	Saxifraga.
Eomecon.	Iberis.	Ononis.	Scabiosa.
Epigæa.	Inula.	Onosma.	Schizocodon.
Epimedium.	Iris.	Origanum.	Scutellaria.
Erigeron.	Isopyrum.	Orobus.	Sedum.
Erinus.	Jaborosa.	Ourisia.	Sempervivum.
Eriogonum.	Jasione.	Oxalis.	Shortia.
Erodium.	Lewisia.	Oxytropis.	Sibthorpia.
Erysimum.	Linaria.	Papaver.	Silene.
Erythræa.	Linnæa.	Parochetus.	Soldanella.
Galax.	Linum.	Paronychia.	Spargula.
Gaultheria.	Liriope.	Pentstemon.	Statice.
Gaura.	Lithospermum.	Phlox.	Stylophorum.
Gentiana.	Lychnis.	Phyteuma.	Tanakæa.
Geranium.	Lysimachia.	Plumbago.	Teucrium.
Geum.	Meconopsis.	Polemonium.	Thalictrum.
Glaux.	Megasea.	Polygonum.	Thymus.
Globularia.	Mentha.	Potentilla.	Tiarella.
Gnaphalium.	Mertensia.	Pratia.	Tradescantia.
Gypsophila.	Mimulus.	Primula.	Trillium.
Haplopappus.	Mitchella.	Pulmonaria.	Tunica.
Helonias.	Molucella.	Pyrola.	Uvularia.
Herniaria.	Morisia.	Pyxidanthera.	Veronica.
Heuchera.	Muehlenbeckia.	Ramondia.	Vinca.
Hieracium.	Myosotis.	Ranunculus.	Viola.
Hippocrepis.	Nepeta.	Rhodiola.	Wahlenbergia.
Horminum.	Nertera.	Romanzoffia.	Wulfenia.
Houstonia.	Nierembergia.	Ruscus.	Zauschneria.

Romneya Coulteri.—A fine Californian Poppywort, 2-8 ft. high, with deeply cut leaves and large sweet-scented white flowers, 6 in. or more across, from June to September, and with a conspicuous bunch of golden-yellow stamens in the centre. The simplest way to raise plants is from



Fig. 241.—*Rudbeckia hirta*

seeds sown in heat in spring, afterwards potting the plants up singly in small pots for sale. When planted in the open they must have the warmest, sunniest, and most sheltered spots, and require protection in winter in most places.

Rudbeckia (CONE FLOWER).—A genus of North American annuals and perennials, vigorous in growth and glowing in colour, the flowers being remarkable for the raised cone-like disk in the centre. They flourish in any good garden soil, and may be raised from seeds and by division of the roots in autumn or spring

The best perennial kinds are *californica*, 5-6 ft., with large oval leaves and golden-yellow flowers 5 in. across; *columnaris*, 2-3 ft., with divided leaves and orange-yellow florets; *hirta* (fig. 241), 1-2 ft., yellow; *laciniata*, 2-15 ft., leaves deeply divided, flowers clear yellow, 3-4 in. across. There is a double-flowered variety, called "Golden Glow", which is particularly handsome; *maxima*, 4-8 ft., has large ovate blue-green leaves, and bright-yellow flowers 3-4 in. across; *purpurea* is now known under its old name of *Echinacea* (see p. 38); *speciosa* or *Newmanni*, 2-3 ft., popularly called "Black-eyed Susan", is very free flowering, the rich orange blossoms having a dark centre; *subtomentosa*, 3-4 ft., is a somewhat downy plant with fine starry yellow flowers scented like new-mown hay; *nitida* is a rather rare plant, very free in producing its rich-yellow flowers.

Sagina (Spergula) pilifera.—A pretty tufted moss-like plant from Corsica, with narrow awl-shaped leaves and small white flowers in summer. The variety *aurea*, with golden-tinted foliage, is popular for carpet bedding.

Salpiglossis sinuata.—This fine Chilean hardy or half-hardy annual has given rise to many choice varieties remarkable for the beautiful colour and veining of their large tubular flowers. The plants usually grow about 2 ft. high, and have somewhat clammy stems and leaves, and the colour of the blooms varies from orange to salmon, cerise, violet, purple, crimson, &c., all conspicuously veined, as shown in the coloured Plate. Seeds and young plants sell freely in spring. There is nothing to equal a bed of well-grown *Salpiglossis* in bloom in the open air during the summer months.

Sanguinaria canadensis (BLOOD ROOT).—A pretty North American Poppywort, 3-6 in. high, with lobed leaves, and beautiful white flowers in April and May. Easily grown in moist sandy peat, or leaf mould and loam, and propagated by division or seeds.

Sanvitalia procumbens.—A good Mexican half-hardy annual with trailing stems, and bright-yellow Marguerite-like flowers with a dark-purple disk. The double-flowered form is wholly yellow and more showy.

Saponaria (SOAPWORT).—A genus of annual and perennial herbs useful for beds, borders, and rockeries. *S. calabrica* is a fine annual, 6-12 in. high, with rosy flowers. There are several varieties, all easily raised from seeds sown in heat or in the open air in spring, and also in early autumn. *S. Vaccaria*—the Cowherb—is a European annual, 1-2 ft. high, with panicles of red flowers.

Amongst perennials the best are the Common Soapwort (*officinalis*), also known as "Bouncing Bet". It grows 1-2 ft. high, and has white or lilac flowers. The double-flowered pink form is a good plant. *S. cæspitosa* is a good tufted rock plant with pink flowers, and *S. ocymoides*, with myriads of rose-pink flowers, is a trailing plant for the rockery. It has a white variety.

Saxifraga.—Of the 160 species known, the only one grown in great quantity for market is the Common London Pride or St. Patrick's Cabbage (*S. umbrosa*), really a native of the Kerry mountains and the Spanish Peninsula. It has rosettes of spoon-shaped coarsely toothed leaves, and throws

up clammy clusters of beautiful white flowers, dotted with pink in early summer, in great profusion. The plants flourish anywhere in shade or sunshine in any garden soil, and produce offsets with remarkable freedom. There is therefore no trouble in keeping up the stock. The young offsets should be taken off in August or September—earlier or later according to circumstances—and dibbled about 4 in. apart in beds 4 to 5 ft. wide. In this way over 300,000 plants can be got to an acre, allowing for pathways, and if they realize only a farthing each, the receipts are over £300 per acre. Unfortunately anyone can grow London Pride, therefore it would be

unwise to overstock it. Amongst nurserymen a very good trade is done with the “mossy” and “en-crusted” species of Saxifrages, as well as with the large-leaved or “Megasea” section. They are charming plants for rock gardens and borders; while one large-leaved species, *S. peltata*, the Umbrella Plant, with leaves often 18 in. across, is a first-rate plant for the sides of lakes, streams, pools, &c. The reader interested in these species would do well to consult the *Practical Guide to Garden Plants* (J. Weathers), which contains full descriptions of most species with cultural details.

One other species is sometimes found grown in quantity for market, viz. *S. sarmentosa*, known under such popular names as Aaron's Beard, Creeping Sailor, Mother of Thousands,



Fig. 242.—*Saxifraga apiculata*

Wandering Jew, Pedlar's Basket, and doubtless many others. It is a Chinese plant, with roundish, hairy, roundly toothed leaves, mottled above, red beneath, and has white flowers spotted with yellow and red. Numerous young plants are produced at the end of creeping stems. The plants flourish in any garden soil, and are generally grown in hanging pots or baskets. The variety *tricolor* has the leaves blotched with green, white, and red, but is more tender than the common variety. Both can, however, be grown in a cool greenhouse or frame, and are increased by the offsets.

The following is a good selection of “cushion”, “mossy”, and “en-crusted” Saxifrages:—

CUSHION SAXIFRAGES—All white flowered, except where otherwise stated: *apiculata* (yellow) (fig. 242), *Burseriana*, *crenata*, *cæsia*, *corio-*

phylla, *Elizabethæ* (yellow), *Ferdinandi-Coburgi* (yellow), *Frederici-Augusti* (pink), *juniperifolia* (yellow), *marginata*, *Patraschi*, *Rocheliana*, *sancta* (yellow), *Salamoni*, *tyrolensis*, *valdensis*.

MOSSY SAXIFRAGES.—All white flowered, except where otherwise stated: *anceps*, *aquatica*, *Arkwrighti*, *cæspitosa*, *Clibrani*, *decipiens* (red), and varieties *Bakeri*, *cruenta*, *Bathoniensis*; *densa*, *geranioides*, *Guildford Seedling* (crimson), *Haworthi*, *hirta*, *hypnoides*, *Iratiana*, *Lindsayi*, *Maweana*, *muscoides* and its variety *purpurea* (purple), *palmata*, *pedemontana*, *Rhei*, *Stansfieldi*, *tenella*, *trifurcata*, *Wallacei*, *Willkommi*.

ENCRUSTED SAXIFRAGES.—All white flowered, except where otherwise stated: *Aizoon*, with pink and yellow varieties (*rosea* and *lutea*); *ambigua*, *Boydi* (yellow), with a white variety; *aretioides* (yellow), *Camposi*, *carinthiaca*, *cartilaginea*, *cochlearis*, *Cotyledon*, *crustata*, *diapensioides*, *Hosti*, *Kolenatiana*, *lantoscana*, *lingulata*, *longifolia*, *Macnabiana* and variety *alba*; *nepalensis*, *notata*, *pectinata*, *pyrenaica*, *rhætica*, *scardica*, *Vandelli*.

Scabiosa.—The plant known as “Sweet Scabious” or “Mournful Widow” is often grown for cut flowers in quantity. It is raised from seeds every year, being an annual, and in July and August produces its flower heads of crimson, white, purple, yellow, lilac, and intermediate shades, according to variety, in great profusion on stems 2-3 ft. high. There are many varieties, all worth growing for their beauty. The seeds may be sown in shallow drills, about 12-18 in. apart, in March, April, and May to keep up a succession, or in September to secure an early supply of bloom the following year.

S. caucasica is a handsome Caucasian plant, 1-3 ft. high, really a perennial, but often grown as a biennial. The soft lilac-blue flower heads, 3 in. or more across, borne on stems 2-3 ft. high, are much appreciated. There are several varieties, including a white one. The seeds may be sown in gentle heat in February and March to plant out in April; or in May to transplant in September for flowering the following year.

Schizanthus.—This genus



Fig. 243.—*Schizanthus retusus*

contains several species of hardy or half-hardy annuals, which may be raised like China Asters every year. The best-known kinds are *Grahami*, 2 ft., with lilac, rose, and yellow flowers; *pinnatus*, 2 ft., blue, lilac, or purple, with many varieties, including a dwarf "Tom Thumb" strain; *retusus*, 2 ft., deep rose blotched with yellow (fig. 243). *Wisetonensis* is a fine bushy free-flowering plant, useful for pot work or for planting out. All kinds are remarkable for having the leaves finely divided and cut.

Schizocodon soldanelloides.—A pretty little Japanese rock plant, 2–4 in. high, with roundish leaves which turn to a dark purple in winter, and pairs of drooping bell-shaped flowers from March to June, the petals being cut into thread-like fringes. It likes a peaty soil and sheltered spots, and is increased from seeds and by careful division.

Schizopetalon Walkeri.—A curious Cruciferous Chilian annual, 1–2 ft. high, with divided leaves, and sweet-scented white flowers having fringed petals. Seeds may be sown in the open air in March and April, or in heat.

Scilla (SQUILL).—The Scillas are a numerous family, and include the British and Spanish Bluebells (see article on "Bluebells"). The best-known and most-remunerative species from the bulb merchant's point of view is *S. sibirica*, a native of Siberia, with rather small bulbs, and loose, drooping, bell-shaped, starry flowers produced early in the year. There are several varieties, including a charming pure white one. As a market plant the Siberian Squill has practically no value as a cut flower, being too short-stemmed and few-flowered. Its chief value is for planting extensively beneath early-flowering deciduous trees and shrubs in large parks and gardens for effect in spring.

Sedum (STONECROP).—The best-known member of this genus is the Common Stonecrop (*S. acre*), with small fat leaves and masses of golden-yellow starry flowers. The plant flourishes in any dryish soil, and is largely sold in boxes in spring, being a remunerative crop when large quantities are disposed of. Other similar species are *anglicum*, *rupestre*, *Aizoon*, *album*, *altissimum*, *dasyphyllum*, and a peculiar fasciated one called *monstrosum*—all useful for rock gardens, and easily propagated by division. *S. roseum* is a British plant, 6–18 in. high, with yellow or purplish flowers; *S. Sieboldi* and its variegated form is frequently grown in pots or hanging baskets, and has pinkish flowers; and *S. spectabile* (or *Fabaria*) is a fine perennial, 1–2 ft. high, with grey-green fleshy leaves and large flat-headed trusses of pinkish-purple flowers in late summer. *S. Maximowiczii* is similar in appearance, but has yellow flowers in July.

Sempervivum (HOUSELEEK).—The Houseleeks are an easily grown group of plants with fleshy leaves in dense rosettes, and are valuable for old walls, roofs, rockeries, &c., in dry soil or old mortar rubble. The Common Houseleek (*S. tectorum*) is sold freely, and so is the Spider-web Houseleek (*S. arachnoideum*), a Pyrenean species with cobwebby hairs over the leaves. *S. calcareum* (erroneously called *californicum*) and *S. montanum* are also excellent. There are many others not so well known (see *Practical Guide to Garden Plants*, pp. 441–3) that are as easily grown, and might be more

generally cultivated. They are readily propagated by separating the young plants or offsets from the old ones, and replanting in autumn or spring.

Senecio.—The fact that such a troublesome weed as the Common Groundsel (*S. vulgaris*) belongs to this genus is not in its favour. Still there are several kinds so free in growth and bold in habit, and so useful for rough soils, that they might be grown in small quantities. The best of these coarse-growing kinds are *S. Doria*, *S. macrophyllus*, and *S. sarra-cenicus*, all with yellow flower heads; and *S. sagittifolius*, which is creamy white. *S. clivorum* has large leaves and deep orange-yellow flower heads, and is well adapted for marshy spots, or on the banks of streams, &c. *S. pulcher*, with beautiful rose-purple flower heads, is a charming perennial, 2-3 ft. high, from Buenos Ayres, but it is rather difficult to grow well, and is not hardy in all parts. *S. elegans* is a fine South African annual 1-2 ft. high, with purple heads having yellow centres; but there are many garden forms with colours varying from white to lilac, rose, crimson, purple, magenta, &c. They are raised from seeds like the China Asters.

Shortia galacifolia (fig. 244).—A charming North American rock plant,



Fig. 244.—*Shortia galacifolia*

3-6 in. high, having roundish leaves becoming purple red in winter, and with funnel-shaped flowers in March and April, white shading into rose. The Japanese *S. uniflora* has soft pink flowers. Both kinds like sandy peat and loam, and are increased by careful division and seeds.

Sidalcea.—A small genus of North American Mallowworts, of which the best known are *S. malvæflora* (*Callirhoe spicata*), 2-3 ft. high, with lobed leaves and erect spikes of lilac or pale-rose flowers 2 in. across. The variety *Listeri*, with fringed

pink flowers, is a better plant. *S. candida*, 2-3 ft. high, has white flowers. Both species are perennial, but may be raised from seeds, and treated as hardy or half-hardy annuals.

Silene pendula.—This is a popular hardy annual, 6-12 in. high, having single- and double-flowered varieties, useful for carpeting the ground over bulbous plants or beneath tall-stemmed kinds. The colours vary from white to rose, crimson, lilac, and purple, and are very effective, as the flowers are borne in great profusion, the double-flowered forms being very fine. The plants are sold in pots or boxes in spring and autumn, the *compacta* varieties being most popular.

Amongst the perennial species of *Silene* mention may be made of

Commercial Gardening

S. acaulis and its double-flowered form, a dense-tufted species with pink, rose, crimson, or white flowers; *S. Elizabethæ*, bright rose; *S. maritima flore pleno*, white, double; *S. Pumilio*, 3 in. high, rose; *S. Saxifraga*, 6 in., white; *S. Schafta*, 12 in., purple; *S. Zawadski*, white.

Snapdragon (*Antirrhinum majus*).—The original species from which the numerous varieties now grown have sprung is indigenous to England, and may frequently be seen growing on old walls or chalk cliffs in various parts of the country. From this it may be inferred that the plant prefers a certain root-dryness, or at least a light, well-drained soil. Such a deduction would be quite correct.

To-day there are three distinct types or classes of these flowers, viz. "tall", which attain to 3 ft. high; "intermediate", from 1½ ft. to 2 ft. high; and the "dwarf" or "Tom Thumb" set, which are rarely more than 6 in. high. Each group or set contains a great variety of colour—yellow, white, crimson, and the like. For general purposes, while the Tom Thumb and tall-growing varieties are valuable in their way, the intermediate section must, I think, be regarded as the most serviceable. This group embraces orange, apricot, pink, crimson, white, and yellow, with intermediate shades. The varieties of this set are as valuable in the cut state or in pots as they are in the garden. Hence to the commercial gardener who delights in having more than one string to his bow they are most desirable.

The seeds of these plants—and it should be remembered that all classes come true from seeds—constitute a distinct and valuable asset not to be overlooked. For garden purposes and for seed-growing these *Antirrhinums* should be regarded as half-hardy annuals, sowing the seeds in January or February of each year. A great trade is done by selling shallow boxes of seedlings every spring.

[E. H. J.]

Solidago (GOLDEN ROD).—Coarse-growing but ornamental perennials with feathery trusses of golden-yellow flowers. They grow anywhere, but prefer sunny places, and may be easily increased by division in spring. There are about eighty kinds known, the best being *canadensis*, *rigida*, *rugosa*, *Shorti*, and *speciosa*, varying from 3–6 ft. high; and *S. Virgaurea*, 1–2 ft.

Solomon's Seal (*Polygonatum multiflorum*).—From a commercial point of view Solomon's Seal must be regarded as among the lesser lights, yet possessing a value of its own in the early forcing department and because of its inimitable and graceful habit of growth. The plant produces fleshy underground shoots or rhizomes, which in October may be lifted, the larger ones being selected for sale and for forcing. The plant grows freely in the rich moist soils of the garden and in shade, and, given these conditions, asks for nothing more. Producing a mat of rhizomes below ground, a large number of its roots may be planted on a small space, and when of forcing size find a ready sale.

In some market gardens Solomon's Seal is planted between the standard or half-standard fruit trees, and flourishes exceedingly well, throwing up leaf stalks 3 ft. long, and having from twelve to eighteen clusters of droop-

ing white blossoms. In May plants grown in this way are valuable for cutting, and find a fairly ready sale. [E. H. J.]

Spigelia marilandica.—A pretty North American perennial, 6–18 in. high, with dense tufts of four-angled stems, ovate Gentian-like leaves, and trusses of tubular flowers of a deep red or crimson outside and yellow within. It is easily grown in a moist peaty soil in cool places, and may be increased by careful division in spring.

Spiræa (Herbaceous).—A great trade is done in herbaceous Spiræas. They are all easily grown in the open air in ordinary good garden soil, but several of them, like *venusta*, rose; *gigantea* (or *kamtschatica*), white; and *lobata*, rose carmine; as well as the common British white Meadow Sweet (*S. Ulmaria*), like damp situations, and are largely used for planting by the sides of streams, ponds, lakes, &c. *S. palmata* (fig. 245), from Japan, with rosy flowers, is a charming plant; and *S. Aruncus*, the Goat's Beard, makes a splendid specimen, 3–5 ft. high, with feathery panicles of creamy-white flowers. *S. Filipendula* is an evergreen species with rosettes of deeply cut fern-like foliage resting on the ground, and with tall spikes of white blossoms during the summer. There is a fine double-flowered form of it, useful for cutting. The Shrubby Spiræas are dealt with in Vol. IV, and the plant known as *S. japonica* in the next section.

Stachys lanata.—A popular Caucasian perennial with dense masses of wrinkled, oblong-elliptic leaves covered with silvery-white woolly hairs. It is a very useful plant for borders, and produces its small purplish flowers in July on stems 12–18 in. high. These, however, should be suppressed to maintain the effective silvery appearance of the plants. Propagation is easily effected by division in autumn, and the young plants are sold in boxes in spring. About 80,000 can be grown to the acre, but one should not overstock such a free-growing hardy plant.

Statice (SEA LAVENDER).—There are annual and perennial species in this genus, some being perfectly hardy, others somewhat tender. Of the perennial kinds *S. latifolia* is undoubtedly the best. It has large wavy



Fig. 245.—*Spiræa palmata*

leathery leaves, and produces immense, branching, flattish clusters of pale lilac-blue flowers in July and August, when they sell fairly well in market. There is a rare white-flowered form. This species may be increased by division in spring or by root cuttings inserted in sandy soil from October to January. Other useful perennial species are *caspia*, purple; *Fortunei*, yellow; *Gmelini*, deep lavender; *Limonium*, deep blue, with a white variety.

The annual Sea Lavenders have become popular of late years, chiefly for their cut-flower stems, which last a long time and are almost looked upon as "Everlastings" in the same way as the *Helichrysums* and *Rhodanthes*. They are best raised in gentle heat in the same way as China Asters in spring, and may be sold in boxes or pots for planting out in borders later on. The best kinds are *Bonduelli*, 1 ft., golden yellow; *spicata*, rose purple; *Survorowi*, bright rose; *sinensis*, pure white with canary yellow; *superba*, rose; *sinuata*, blue, with several showy varieties having rose and white flowers.

The more tender kinds of *Statice* are grown in greenhouses in a compost of loam, leaf soil, and well-rotted manure with a dash of coarse sand. They are raised from seed like the annual kinds, and are pricked out and potted on as they increase in size. No great trade is done in them, however. Perhaps the best kind is *macrophylla*, light blue with a rich dark-blue variety, *atrocærulea*; and *Bourgæi*, purple and white; *imbricata*, pale blue; *puberula*, blue and white; *rosea*, rose; *profusa*, lilac.

Stellaria graminea aurea.—This is a dwarf golden-leaved variety of Chickweed which makes an excellent carpet-bedding or edging plant. It can be cut close, and made to look effective beneath "dot" plants.

Stock, Ten-week (*Matthiola annua*).—The parent of the Ten-week Stock is a South European annual, 1–2 ft. high, having somewhat hoary lance-shaped leaves, and erect, branching spikes of flower with varying colours.

The garden varieties are very numerous, and now include many different colours, such as pure white, scarlet, rose, purple, carmine, primrose, light and dark blue, mauve, violet, pink, &c.—the double-flowered kinds being most extensively cultivated. Particularly good kinds are *White Mammoth*, *Princess Alice*, and *All the Year Round*, which have fine spikes of pure-white double flowers. *Princess May* is a fine primrose-yellow variety, and one known as *White Christmas* is useful for winter bloom, as its white blossoms can be brought to perfection under glass. The *Giant Perfection* strain of Ten-week Stock is deservedly popular, and may be had in all shades of colour, separate or mixed (fig. 246).

A great trade is done in Ten-week Stock in the seeds, young plants, and in the cut spikes of bloom. For summer work the seeds are sown in February or March in shallow boxes, in rich gritty soil, in the gentle heat of a greenhouse or hotbed. The seedlings are pricked out into similar boxes and soil when large enough to handle easily, and by the end of May, or earlier, are sold largely for bedding purposes. When

planted out in rich, moist, but well-drained soil, Ten-week Stocks flower freely during the summer months, coming into bloom by the middle or end of June, and are cut for market.

The "Intermediate" Stocks are also derived from the same parent (*Matthiola annua*) as the Ten-week Stock, and are particularly valuable for their trusses of scarlet, white, or purple flowers early in the year. The seeds are sown in July and August, and the plants may be wintered in cold frames, or planted out on warm sheltered borders.

The "EAST LOTHIAN" Stock is a form of the Intermediate, and has varieties with white, purple, and crimson flowers which appear in the autumn after the Ten-week Stocks are over. The seeds are sown in March or April to produce flowering plants at this period.

The "QUEEN" Stocks, and the Wallflower-leaved Stocks (with green shining leaves) and the Brompton Stocks, are said to be derived from *Matthiola incana*, a biennial from Southern Europe, the Canary Islands, &c. Of the Queen Stocks there are purple, scarlet, rose, and white varieties, as in the Brompton Stocks, and about 60 per cent produce double flowers. The seeds are sown in June or July in shallow boxes or frames, and the young plants are wintered in cold frames in some places, or planted in warm, sheltered borders in favourable localities. They are chiefly valuable for cut flowers, and choice and well-grown samples often realize remunerative prices.



Fig. 246.—Ten-week Stock

Stokesia cyanea.—A fine North American perennial, 2 ft. high, with lance-shaped leaves and large lavender-blue flowers in autumn; the variety *alba* has white flowers. Likes well-manured loamy soil, and may be increased by slips and seeds. Some years ago the flowers of this plant were popular for florists' work in autumn.

Sunflower (*Helianthus annuus*).—The common Sunflower is too coarse a plant for horticultural purposes, although useful enough for producing supplies of valuable seed for agricultural and other purposes. There are, however, many choice varieties, some miniature forms (fig. 247) of which are only 2-3 ft. high, which produce handsome blossoms varying in colour from soft primrose to deep golden yellow with a dark centre. Some good

forms worth growing for cut flowers are Golden Nigger, Sulphur Gem, Apollo, Diadem, Starlight, &c., amongst the singles, while there are also



Fig. 247.—Miniature Sunflower

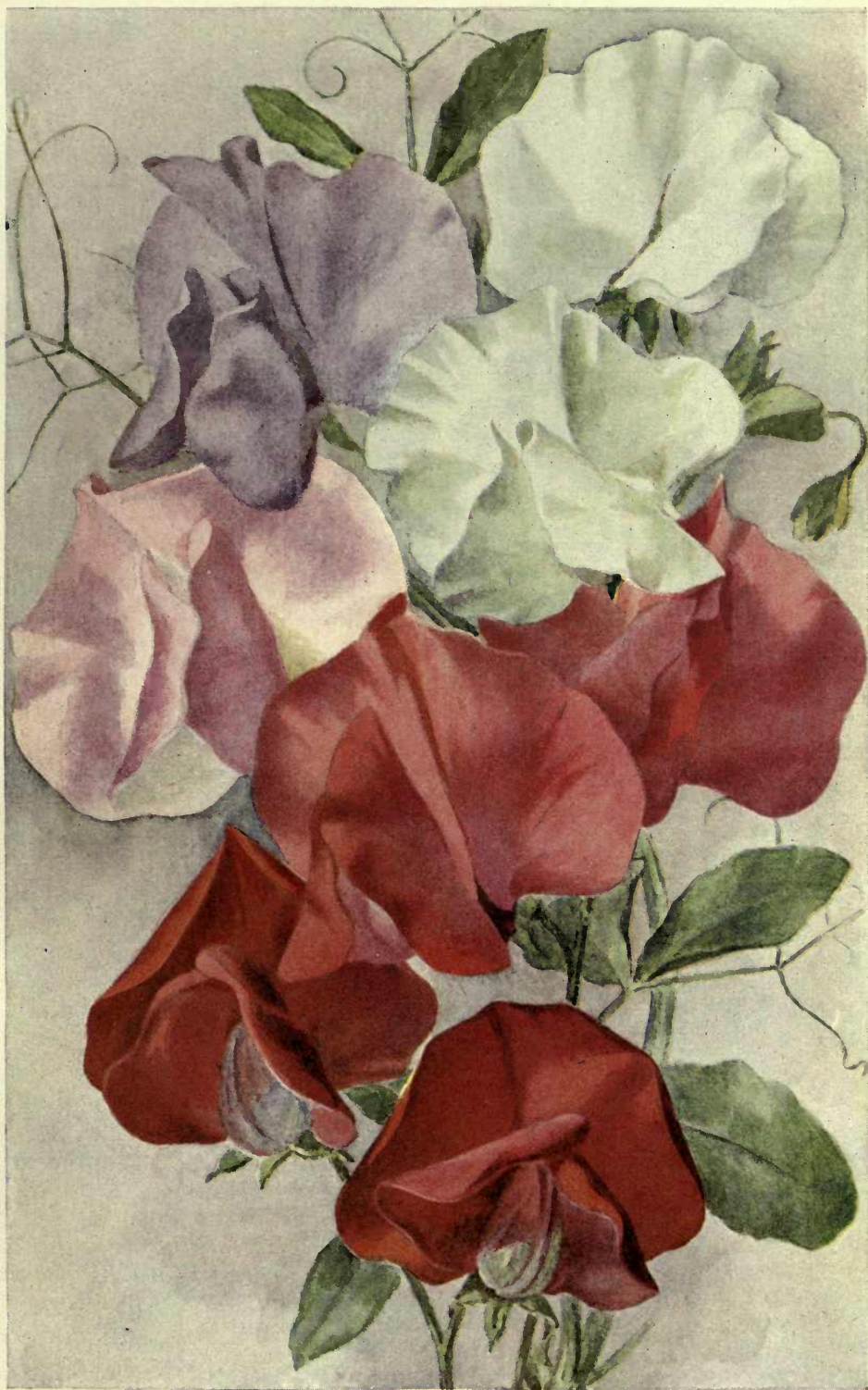
double forms. They are all easily raised from seeds sown in the open air in April and May, or in warmth in March, the young plants being spaced out eventually about 2 ft. apart. The perennial Sunflowers are considered under the genus *Helianthus*, see p. 51.

Sweet Pea (*Lathyrus odoratus*).—The Sweet Pea industry is now a very large one, thanks to the grace and beauty of the flowers, the comparative ease with which they may be grown, and the wonderful varieties that patience and skill have evolved during recent years. Growers of flowers or seeds have to thank the National Sweet Pea Society

for the great advance this industry has made during the past ten or twelve years. Probably there are more tons of Sweet Pea seeds sown now than there were hundredweights a dozen years ago, while the size and beauty of the varieties and the range of colours provided are all due chiefly to the encouragement this society has given to its name flower. The seed-growers in Essex have added acres to acres year after year for the purpose of providing the necessary seeds, and the visitor to Kelvedon, Coggeshall, and surrounding district is greeted with the daintiest of perfume and a perfect ocean of lovely blooms. (See coloured plate.)

In other districts large areas are devoted to flower culture for market. The earliest flowers grown under glass come chiefly from the Channel Islands, Cheshunt, Uxbridge, Worthing, Hampton, Uckfield, Haywards Heath, Saffron Walden, and Waltham Cross. Cornwall supplies early outdoor blooms, and then come quantities of flowers from such districts as those of Woking, Hanworth, Slough, Farnham, Rockley, Yarmouth, Guildford, and Cambridge.

According to the time of year, and also to the quality of the flowers, the market bunches consist of 12, 18, or 24 spikes. These bunches are packed in a single layer, and the box that finds most favour is one 24 in. by 15 in. by 3½ in.; it carries from eighteen to twenty-four bunches. The colours most in request at Covent Garden and other large flower markets are white, crimson, lavender, mauve, pink, rose, salmon, blue, blush, cerise, cream, and scarlet. Varieties of Sweet Peas that are at present very popular



(22)

SWEET PEAS

1, Masterpiece. 2, Enchantress. 3, King Edward VII. 4, John Ingman. 5, Etta Dyke.

on the market are *Dorothy Eckford*, white, plain standard; *Lord Nelson*, blue, plain; *Lady Grizel Hamilton*, lavender, hooded; *Mrs. Walter Wright*, mauve, plain; *Countess Spencer*, pink, waved; *Queen Alexandra*, scarlet, plain; *King Edward VII*, crimson, plain; *Prince of Wales*, rose, plain; *John Ingman*, carmine, waved; *Bolton's Pink*, bright pink, plain; *Clara Curtis*, bright cream, waved; *Coccinea*, cerise, plain; *Etta Dyke*, white, waved; *Evelyn Byatt*, orange, plain; *Frank Dolby*, lavender, waved; *Gladys Unwin*, pink, waved; *Helen Lewis*, orange, waved; *Miss Willmott*, orange pink, plain; *Mrs. Hardcastle Sykes*, blush, waved; *Nora Unwin*, white, waved; *Mrs. C. W. Breadmore*, cream, rosy edged, waved; and *Constance Oliver*, cream pink. From this list it will be gathered that the market grower still retains many of the older varieties which the amateur and the exhibitor have practically discarded some time since.

In the cultivation of Sweet Peas for market two points must always be kept in mind. These are: (1) that the production of early flowers is essential if good prices are to be obtained, because after the second week in July every garden has its quota of these elegant and fragrant flowers, consequently the demand slackens; and (2) that there is a limited demand throughout the season for flowers of the highest quality carried on long, stout stems.

Some growers put all their energy into the production of early blooms, and as soon as the prices for flowers drop, they clear out the Sweet Peas and follow them quickly with another crop. A few growers possessing sheltered and early land, and following a high system of culture, obtain early flowers, and, according to season, begin to market flowers late in May or early in June, and they manage to keep up a supply of high-class flowers throughout the season by the regular removal of old flowering stems and the encouragement of new ones. It is doubtful, however, whether it pays to keep Sweet Peas going for market purposes after August Bank Holiday, unless some handy holiday resort needs considerable supplies.

Covent Garden prices show plainly that the demand in the metropolis falls off considerably by the beginning of August. During the years 1909 and 1910 the average rates per dozen bunches during the last week of May have been from 2s. 6d. to 6s.; first week in June, 2s. to 6s.; second week in June, 2s. to 6s.; third week in June, 2s. to 5s.; fourth week in June, 2s. to 5s.; first week in July, 1s. 6d. to 4s.; second week in July, 1s. 6d. to 3s. 6d.; third week in July, 1s. 6d. to 3s.; fourth week in July, 1s. to 2s. 6d.; first week in August, 1s. to 2s.

Spring sowing out-of-doors is distinctly not the method to follow for flower production for market, because the flowers do not come early enough, nor do the roots strike deep enough to carry the plants safely over a dry period during the flowering season. Autumn sowing, following a quick crop for which the ground has been thoroughly well worked and manured, is the plan to follow where the soil and situation are suitable. Suitability in this instance resolves itself into well-drained soil of medium or lightish

texture, and a site sheltered from the north and east, but open to air and sunshine.

A firm root run is not merely desirable for Sweet Peas, it is a necessity; therefore the site must be rolled or trodden over if it is ploughed or dug just previous to sowing. A good dressing of lime worked into the surface soil usually proves useful, but the need for it must be determined by the condition of the soil. Soot is also an excellent fertilizer, and its use serves to keep slugs and other ground pests in check. Lime and soot should not, however, be used together, i.e. at the same time, because if this is done the nitrogen in the soot is set free by the lime, in the form of ammonia, and thus the manurial value of the soot is largely lost. Superphosphate of lime and bone meal are excellent fertilizers for Sweet Peas, and in dry weather a little nitrate of soda (1 oz. to 3 yd. run) well watered in gives a wonderful fillip to growth.

Some Sweet Peas have smaller and lighter seeds than others, but as a general rule 1 lb. of seeds will be necessary to sow about 150 yd. run. On specially good soil the strongest growing varieties may be sown at the rate of 1 lb. to 200 yd. On an acre of land it is possible to have ten rows, 220 yd. long and 6 ft. apart. For supports, this amount would need from 330 to 400 bundles of sticks. Just as the price of land varies, so the price of seeds varies with the season and the variety, while in some districts the sticks required for supports are quite cheap and good, and in others more costly and often less useful even at the enhanced price. Growers must take all these points into consideration in their estimate when considering the advisability of growing Sweet Peas for market.

Besides the methods of spring or autumn sowing out-of-doors, there are also those of sowing under glass either in autumn or spring. Many growers sow hundreds of pots of Sweet Peas in October or early November in frames, and keep them just free from frost during the winter; four seeds in a 60-sized pot are sufficient. With reasonable care the plants so raised will be very sturdy by the end of March or early April, and if planted without root disturbance they speedily grow away and come into flower in June. A frame with several lights will hold a very large number of such pots, and if the pots are plunged to the rim in fine ashes there is little risk of danger from frost or from drought at the roots. In connection with this method the grower must always remember that Sweet Peas are hardy annuals, and therefore any coddling process will defeat the end in view. The other method is that of sowing in similar fashion, but in gentle heat, early in February, the seedlings to receive cooler conditions directly they are well through the soil, and be gradually hardened off as the season progresses. Whichever method is followed, and we consider autumn sowing in pots is the best, a few short twigs must be provided for each pot of seedlings to prevent the plants from falling over and clinging to those in a neighbouring pot.

Quite apart from the cultivation of Sweet Peas for outdoor flowering, is their culture for the production of early blooms under glass, and in some

districts this proves a very paying crop. The seeds are sown in pots or boxes about the middle of October, placed in cold frames, and well watered, every care being taken to guard against trouble from mice and slugs. Plenty of ventilation is afforded as soon as the seedlings are through the soil, and should damp warm weather follow it may presently be advisable to pinch out the growing points just above the third pair of leaves. Early in December each plant should be potted in a 3-in. (60-sized) pot, in good loam to which some old manure and sand have been added. Plunge the pots in ashes and keep the frame rather close for two or three weeks after such potting; afterwards proceed to ventilate freely as weather permits. Real business commences early in February, as by this time growth will begin in earnest, and more root room will be needed. It must now be decided whether the Sweet Peas are to be grown in pots or whether they are to be planted out in light airy houses. If pots are to be used, then three plants should be put in a 12-in. pot, or two in an 8-in. pot, and these large pots should have three or four holes near the bottom, through which the roots may pass at a later date. A rich, fairly substantial compost is desirable, as also is firm, but not hard, potting.

At this period the plants must be kept well up towards the glass, because weak spindly growth cannot produce good blooms. When planting out is to be the method, then each Sweet Pea plant must be potted into a 48-sized pot, kept well up to the light until in March they are set out in trenches, in well-drained soil of a similar character to that used for the large pots. Careful ventilation, light houses, and a sufficiency of tepid water must be provided, and full advantage be taken of sun heat. When the large pots are well filled with roots the top growth will have made considerable advance, and the pots should then be partly plunged in trenches of rich compost—loam and old manure—or, if the houses are lofty and there is room for the plants, they may be stood on the stage and have soil banked round and under the lower part of the pot.

No matter which of these two methods is followed under glass the Sweet Peas ought to be about $2\frac{1}{2}$ ft. high by the beginning of April; the haulm short-jointed, and the leaves deep green, and about 3 in. long by $2\frac{1}{2}$ in. broad. During April growth will be fast, often $\frac{3}{4}$ in. per diem. To secure the finest flowers the side growths must be removed until flowering commences. By May-Day, if treatment and conditions have been favourable, the plants should be about 4 ft. high, and showing plenty of spikes just ready to expand their flowers. Now is the time to commence feeding, and there is nothing better than soot water and liquid cow manure, using these alternately, and giving one watering of each per week.

Whether sticks, canes, or wire frames are used as supports must be left to the judgment of the grower; good results may be obtained with each, provided the growths are tied up regularly from February onwards. When the flowering season begins, all spikes must be removed when fit, no matter what the demand may be, for under glass, even more than out-of-doors, it is utter foolishness to allow flowers to seed, as this so taxes the energies of

the plants that they will yield small blooms and short spikes, and rapidly pass out of flower.

[C. H. C.]

Sweet Sultan.—This is botanically known as *Centaurea* or *Amberboa moschata*. It is a Persian annual 1½–2 ft. high, having deeply and coarsely toothed leaves and large musk-scented heads of purple or white flowers. The yellow-flowered Sweet Sultan is derived from *Centaurea suaveolens* (*Amberboa odorata*), and has citron-yellow, sweet-scented flower heads. There are, however, many different varieties now grown, including light blue, pure white, rose, lilac, purple, and other shades. They are all useful for cut flowers for market, and may be grown as catch crops between rows of fruit trees, or in other convenient spaces. The seeds should be sown thinly in shallow drills 12–15 in. apart, from early April to the end of May for a succession, and the seedlings should be thinned out to 9 in. or 1 ft. apart. Relatives of the Sweet Sultan are dealt with under the genus *Centaurea* (see p. 18).

Sweet William (*Dianthus barbatus*).—The Sweet William is one of the best known and most admired of hardy garden flowers, having been grown for centuries in English gardens. The present fine race has been evolved from *Dianthus barbatus*, which, in the wild state, is native of Europe and of comparative insignificance to-day. Perennial by nature and distinctly so, the improved races we have now in mind, and for commercial gardening more particularly, are best regarded as of biennial duration only. Hence the periodical raising of the plants from seeds becomes virtually a necessity.

The seeds should be sown early in April in a well-prepared bed of soil in the open, or in pans or boxes in frames, or in the cool greenhouse in the case of a particularly good strain. Indeed there is much to be said in favour of the latter method generally, such as quicker and more certain vegetation of the seeds, and freedom from the attacks of slugs and other pests.

Like other members of the Carnation family the seeds of the Sweet William vegetate promptly, and in cool greenhouse or frame, sown at the time named, they will be above ground in from fourteen to twenty-one days. Thin sowing and early transplanting are essential, and upon a full appreciation of these a full measure of success depends. The Sweet William is so perfectly hardy that no coddling of any kind under glass should be permitted. Plant out in August or September in open quarters, or earlier if a good watering can be given. Grown for the sale of their roots alone, 8 in. apart will be a sufficient distance. If grown for seed-saving purposes—and the best strains are highly desirable from this point of view—not less than 18 in. from plant to plant should be given. The Sweet William may also be raised from cuttings inserted in a cold frame in August or thereabouts. Indeed novelties of merit, until the seed strain is fixed, must be so treated, and so, too, the double-flowered varieties, of which *D. b. magnificus* is the most desirable. (For other kinds of *Dianthus* see p. 35.)

Of varieties, *Pink Beauty* and the *Auricula-eyed* are among the more distinct. There are others, too, in scarlet, white, and crimson. [E. H. J.]

Thalictrum.—A large genus of plants chiefly remarkable for their elegantly cut foliage and graceful appearance. Although many species varying from 6 in. to 4 ft. high are dealt in by hardy-plantsmen, very few are grown by marketmen. One of the most popular kinds is the Maiden-hair Meadow Rue (*T. minus* or *T. adiantifolium*), which resembles a deep-green Maidenhair Fern in appearance, and is frequently mistaken for one. It makes a graceful pot plant, and being a native of Britain is quite hardy. The foliage is useful for cutting and mixing with other flowers. It may be increased from seeds or by division. Another useful species is *T. Delavayi*, from China, 2-4 ft. high, having finely divided leaves and lilac-purple flowers with conspicuous bunches of yellow stamens.

Thunbergia alata.—A pretty half-hardy South African climber with heart-shaped sagittate leaves, and bell-shaped flowers varying in colour from pure white to pale and deep yellow, orange, and purple with a dark-coloured centre, in such varieties as *alba*, *aurantiaca*, *sulphurea*, *Doddsi*, *Bakeri*, *Fryeri*, &c. They are all climbing in habit, and may be easily raised from seeds sown in gentle heat in March, for sale in pots or boxes from April to June.

Thymus (Thyme).—Many kinds of Thyme are grown for rock-garden purposes, among the best being *carnosus erectus*, 9 in.; the golden and silver forms of *citriodorus*; *ericæfolius*, 4 in.; *lanuginosus*; *micans*, 2 in.; *Serpyllum* and its varieties *album*, *coccineum*, and *splendens*; *villosus*, &c.

Tiarella cordifolia (FOAM FLOWER).—A pretty North American rock or border plant, with heart-shaped lobed leaves, and feathery sprays of white flowers from April to June. Grows in ordinary soil, and is increased by division.

Tigridia (TIGER FLOWER).

—A genus of handsome bulbous plants from Mexico, having sword-shaped leaves and large flowers gorgeous in colour, white, red, orange, pink, and purple being the chief tints. They like rich sandy soil, warm, sunny positions, and are increased by division. The best-known species is



Fig. 248.—*Tigridia pavonia*

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T. Pavonia (fig. 248), 2-4 ft. high, with showy flowers, yellow blotched with purple and violet and tipped with scarlet. There are several varieties, such as *alba*, white spotted with purple and red; *grandiflora*; *conchiflora*, &c.

Tradescantia virginiana (SPIDERWORT).—A beautiful North American perennial, 1-2 ft. high, with narrow purple-veined leaves and violet-blue flowers on branching stems in summer. There are several varieties, *alba*, *atropurpurea*, *atroviolacea*, *cærulea*, *purpurea*, *rubra*, &c., differing in colour according to the names. They grow in ordinary soil, and are increased by division. A closely related plant is *Commelina cælestis*, from Mexico, with tuberous roots, oblong lance-shaped leaves, and bright-blue flowers; there is also a white variety.

Tricyrtis hirta (TOAD LILY).—An interesting Japanese plant, 1-3 ft. high, with hairy stems, lance-shaped leaves, and whitish flowers spotted with violet and purple. Other kinds are *macropoda* and *pilosa*, very similar. They flower in autumn, and should be grown in sheltered places in sandy loam and peat or leaf soil. Increased by division and seeds.

Trillium (WOOD LILY).—The best-known species is *grandiflorum*, 1 ft. high, with broad leaves in threes, and pure-white flowers in early summer.

Other kinds are *cernuum*, 1 ft., white; *erectum*, deep purple; *erythrocarpum*, white; *nivale*, white; *recurvatum*, purple; *sessile*, purple; *stylosum*, pink. They are all tuberous rooted, and like a light, organic soil and shaded places. Increased by careful division.

Tritonia.—Under the still-better-known name of *Montbretia* two or three species and several varieties of these fine hardy bulbous plants are grown, chiefly for cut flower and for the decoration of the border. *T. aurea* (now called *Crocospma*), a South African species with sword-like leaves and brilliant orange-red starry flowers in summer and autumn, is a fine plant, and the same may be said of *T. crocosmiæflora*, 2-2½ ft. high, with orange-scarlet funnel-shaped flowers, and *T. Pottsi*, 3-4 ft. high, with bright-yellow



Fig. 249.—*Tritonias*

blooms suffused with red. *T. crocata* has bell-shaped saffron or orange-coloured flowers as early as June. Amongst the many hybrid varieties

that have been raised of late years between these species, and catalogued as Montbretias, are the following: *Croesus*, large yellow; *Diadem*, rich dark-orange petals zoned with a broad maroon ring around the clear yellow eye; *Etoile de Feu*, deep orange-red; *Gerbe d'Or*, rich golden yellow; *Germania*, rich orange flowers; *Le Pactole*, large deep-yellow flowers 3 in. across; *Lutetia*, elegant flowers of a ruddy tint; *Martagon*, deep orange reflexed flowers with orange-red throat; *Messidor*, soft-yellow flowers on tall much-branched stems; *Prometheus*, large flowers 3 in. in diameter, deep orange, touched with orange red around the eye; *Solfaterre*, chrome yellow; *Sunbeam*, clear yellow, rayed with deep orange-red (fig. 249).

Trollius (GLOBE FLOWER).—Beautiful herbaceous perennials closely related to the Buttercups, and valuable for moist borders, rock gardens, &c., but will also flourish in good rich garden soil. They are increased by division, and a fair trade is done in the roots in spring or autumn. The following are the best kinds: *asiaticus*, 1-1½ ft., with its deeper-coloured variety "Orange Globe"; and *japonicus*, *Fortunei*, and *major*—all with fine yellow blossoms. *T. europæus* is a native species, 1-2 ft., having clear-yellow flowers in summer.

Tropæolum.—Under the heading of NASTURTIIUM (see p. 73) some species of *Tropæolum* (*T. majus* and *T. minus*) have already been described, because they are mostly known under that name. The "Canary Creeper" is another species of annual growth with climbing stems, divided leaves, and golden-yellow flowers. It is variously known as *T. peregrinum*, *T. aduncum*, and *T. canariense*, and is easily raised from seeds sown in gentle heat in March. The young plants are largely sold in pots in April and May, the frail stems being held up with a twig or two.

T. Lobbianum, with roundish leaves and long-spurred yellow flowers spotted with scarlet, may also be raised from seeds. There are many garden forms, some having dazzling scarlet or crimson flowers and deep-green leaves, and they are particularly cheerful during the winter. The *hederæfolium* section, with ivy-like leaves and scarlet flowers, are easily propagated from cuttings of the side shoots inserted in sandy soil in a temperature of 60° to



Fig. 250.—*Tropæolum speciosum*

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70° F., and produce nice sturdy plants that may be sold in small pots early in the year. When the dwarf varieties are raised from seed they are sold in shallow boxes in market, the plants being afterwards retailed in patches or whole boxes according to the class of customer.

Amongst the *Tropæolums* stocked by nurserymen, one of the most popular is *T. speciosum*, the Flame Flower (fig. 250), having thong-like roots and tubercles, climbing stems with deeply cut leaves, and brilliant scarlet flowers. It must be grown in cool moist places as it hates hot sunny positions. Other perennial *Tropæolums* are *pentaphyllum*, vermilion; *polyphyllum*, bright yellow, with its variety *Leichtlini*, orange; and *tuberosum*, scarlet and yellow, with pear-shaped crimson speckled tubers.

Tulip.—Tulips have always been a favourite crop with market growers, and consignments in one form or another have been sent to market regularly during the winter and spring season during the past seventy years or so. In the early days the trade was chiefly done in pot plants, from three to five bulbs being grown in a 5-in. (48) pot. The cut-flower trade was practically unknown until after the Indian Mutiny, but during the past twenty or thirty years it has increased enormously. The growers in the north of London (Tottenham and Edmonton) were the first to bring cut flowers of Tulips to Covent Garden, and their example was soon followed by the few others around the metropolis who grew them. In the depth of winter, when the roads were bad and often deep in snow, or heavily frosted, only one or two growers from the neighbourhood of Chelsea and Fulham had the courage to take their flowers to market; and in those days Covent Garden often presented a desolate and deserted appearance—a state of affairs difficult to imagine now.

The varieties grown were almost as few as the growers. The single scarlet Duc van Thol then as now held premier place for the earliest blossoms, and it paid to grow, although the bulbs then cost 7s. 6d. and more per 100 wholesale against about half the price at the present day. But the flowers have deteriorated very much in the meantime. Forty and fifty years ago the blooms of scarlet Van Thol Tulips were much larger, being quite as deep as the first finger, whereas now they are only as deep as the first joint. They have thus shrunk from about 3 to 2 in. deep in half a century, and it is possible that the first early scarlet Van Thols are being played out. Still, they are the best at present, and until something better comes along, or the fashion changes, this variety will hold its own for the best early scarlet Tulip for cut flower.

The bulbs are now grown chiefly in large boxes, 4 or 5 in. deep, filled to within a couple of inches of the top with rich gritty soil. The bulbs are pressed into the soil, and almost touch each other. The first boxes are filled as early as October, but the work continues till after Christmas, where many thousands are forced during the season. The boxes are plunged in the soil outside, or covered with about 6 in. of mould or ashes until the time arrives for forcing the bulbs. The first batches are brought into a greenhouse, having a temperature of 70° to 80° F., about the end



TULIPS

1. Yellow Prince. 2. La Reine (unforced). 3. Thomas Moore. 4. Artus. 5. Rose Gris de Lin.

of November; and, being well rooted at that period, the bulbs grow rapidly with the heat and moisture, so that the first plants are in flower for the Christmas markets, when a good trade in them is anticipated. For many years the bulbs were brought to market in pots, but of late years about two dozen plants in flower are packed into long narrow boxes in coconut fibre and sent to market thus, realizing from 18s. to 24s. per dozen boxes. The cost of forcing Tulips, apart from the price of the bulbs, is about 6s. to 8s. per 1000, so that profits vary according to the first cost of the bulbs, market fluctuations, and the price of fuel in hard winters.

For later work other varieties of Tulip are grown in the same way, but they have larger blooms and longer stems, and find a good sale, although at times the prices are so low as not to pay for the cost of the bulbs. Amongst the best single-flowered Tulips for market work are: *Canary Bird* and *Chrysolora*, yellow; *Duchess of Parma*, orange red, with a yellow border; *Keizerskroon* (fig. 251), rich scarlet, edged yellow; *La Reine*, the very best white for forcing—it comes pinkish and crippled in a low temperature; *Rose Gris de Lin*, bright rose; *Thomas Moore*, soft terra cotta; *Yellow Prince*, rich yellow; *Prince of Austria*, bright scarlet orange; *Rosamundi Huikman*, rose and white. These are amongst the most popular early-flowering Tulips that are forced, but the following may also be worth attention: *Artus* and *Belle Alliance*, both deep scarlet, but rather dear; *Cottage Maid* (or *La Precieuse*), pink, striped with white; *Leonardo da Vinci*, fine orange; *Môn Tresor*, fine yellow; *Ophir d'Or*, large yellow, &c. There are many other fine varieties of early Tulip, but the market grower leaves them to the private gardener.

Amongst the best double Tulips for market work are: *Imperator Rubrorum*, bright scarlet; *Murillo*, delicate rose; *Grand Vainqueur* and *Rose Blanche*, white; and the old *Tournesol*, red and yellow, which is one of the oldest double Tulips grown for market. There are many other varieties in catalogues, but the prices are either too high or they fail in some respects from the grower's point of view so that they do not find much favour.

Where open ground and cold frames are available, Tulips have been grown without heat of late years for market. They entail no expenditure for coal or coke, or houseroom, and, following on the forced varieties, they sometimes realize more remunerative prices. The self-coloured Darwin Tulips are the best for this purpose. They should be planted as early as possible in autumn about 6 in. deep and 6 in. apart, in rich and well-



Fig. 251.—*Tulipa Gesneriana*,
var. *Keizerskroon*

drained soil on warm sheltered borders, or in beds about $4\frac{1}{2}$ ft. wide. They flower freely, and the bulbs may be grown for several years in succession if necessary. It is better to take them up after the leaves have withered; but if covered with a layer of old soil or manure, a crop of China Asters or Ten-week Stocks may be taken off the same ground during the summer months. There are many kinds of Darwin and Cottage Garden Tulips, varying in price from 50s. and upwards per 1000; but market growers confine themselves to a few that experience tells them will sell best.

The curiously cut Parrot Tulips and the several natural species are dealt in chiefly by bulb merchants, and fairly large numbers are purchased by the owners of large gardens and by public-park authorities.

Ursinea pulchra (*Sphenogyne speciosa*).—A pretty Mexican annual with divided leaves, and creamy-yellow Marguerite-like flowers, 2-3 in. across, with a blackish centre. There are several forms of it. Seeds may be sown in spring to produce plants for bedding out in May and June.

Venidium calendulaceum.—A showy South African composite, 6-12 in. high, with Dandelion-like leaves white beneath, and bright golden-yellow flowers with a blackish centre resembling those of the Common Marigold. This plant, although really a perennial, is usually raised from seeds sown in March or April.

Veratrum album (WHITE HELLEBORE).—A distinct Caucasian plant, 3-5 ft. high, with broad deeply ribbed leaves and erect trusses of white and greenish flowers. *V. nigrum* and *V. viride* (*Helonias viridis*) have purplish and greenish flowers respectively. All kinds have poisonous rootstocks, from which the Hellebore powder of commerce is prepared. (See Vol. I, p. 215.) The plants like a rich, loamy soil, with a little peat or leaf mould, and are increased by seeds and division.



Fig. 252.—*Veronica spicata*

Verbascum (MULLEIN). — A large group of bold-growing plants as easily grown as Foxgloves, and raised from seeds in most cases. The best kinds include *Caledonia*, *Chaixi*, *densiflorum*, *nigrum*, *olympicum*, *pannosum*, *phlomoïdes*, all with yellow flowers in summer and autumn, in long erect spikes up to 10 ft. high in some cases. There are white-flowered forms of *Chaixi* and *nigrum*, while *phœniceum* has purple, white, violet, lilac, rose, and forms.

Veronica (SPEEDWELL). — A large genus of hardy and half-hardy herbaceous and shrubby plants differing greatly in appearance and habit. Among the best of the herbaceous group are *gentian-*

oides, 1½ ft., porcelain blue, with a white-flowered variety (*alba*), and one with variegated leaves; *incana* (or *candida*), dark blue or purple, with silvery leaves, often used for carpet bedding; *longifolia*, 2-4 ft., lilac, white, rose, or purple, often confused with *spicata*, a British plant, 6-18 in. high, with spikes of bright-blue flowers (fig. 252). There are several varieties of *spicata*, such as *alba*, white; *nana*, 6-9 in. high; *rosea*, pink; and a form with variegated leaves. *V. Teucrium*, 9-12 in., decumbent, pale or deep blue; the variety *prostrata* or *rupestris* is a very useful edging plant with masses of deep-blue flowers or white in the form *alba*; *V. pectinata* and *V. repens* are also trailing species with bright-green leaves and pale-blue flowers. *V. virginica* (Culver's Physic) is a noble plant, 2-6 ft. high, with long spikes of blue flowers—white in the variety *alba*.

Viola.—Apart from the florist's Violas and the Sweet Violet there are several natural species grown for rock gardening and borders, among them being the following: *biflora*, 3 in., yellow, May to June; *calcarata*, 3 in., pale mauve, May to June, with a few forms; *cornuta*, 6 in., deep blue, with a white variety, April to August; *cucculata*, 6 in., pale to deep violet, with a white variety; *gracilis*, 3-6 in., deep violet blue, April to August; *Munbyana*, 6 in., violet, with a yellow form (*lutea*), spring to autumn; *pedata*, 3 in., bright blue, but mauve and violet in the variety *bicolor* and white in *alba*, April to July. They like a deep loamy soil with plenty of sand and leaf mould, and are increased by division and seeds.

Violas and Pansies.—The name "Tufted Pansy" has been given to a popular race of plants formerly recognized in catalogues and books as "Bedding Violas", and which had their origin in *Viola cornuta* and one of the older types of so-called bedding Pansies. But by whatever name we call them there is no getting away from the fact that they are among the indispensables of the flower garden, as much because of their great variety and charm as for a flowering which closely approximates to perpetual. Massed in the garden, there is a freshness about their spreading carpets of green, and a coolness even in the height of summer-time which cannot be denied, and which, in conjunction with perfect hardiness and simple cultural requirements, have rendered them immensely popular with all those who engage in outdoor gardening (fig. 253).

CULTURE.—The Tufted Pansy may be grown to perfection in almost all classes of soils save those abounding in chalk or much sand, and while delighting in cool soils and a cool rooting meeting abhor those of opposite extremes. Hence any good well-cultivated garden soil that will grow a cabbage or potato to perfection is well suited to them; albeit, generally speaking, they are far happier in northern than in southern districts.

PROPAGATION.—Grown on a large commercial scale for the disposal of the plants, the only rational method of increase is by means of cuttings, while the only rational cuttings are youthful ones. Old flowering stems are valueless.

To secure cuttings of the right stamp, the old plants should be cut over with knife or shears about the middle of June, when the first flush

of flower beauty has gone. A light stirring of the soil among the plants, a rather free mulch, half-soil half-manure, finely sifted in and around the plants, followed by a few copious waterings, and all will be well.

At the end of a fortnight or thereabouts the old stems will be seen to be bristling with young shoots, which at 3 in. in length are ideal for the purpose in view. Such shoots may be made into cuttings in the ordinary way and inserted in a cold frame in sandy soil; or, by leaving them a while longer on the parent plant, it will be found that they will



Fig. 253.—Violas or Tufted Pansies

be freely rooted at the base, and may be at once transferred to a shaded border of prepared soil. Where this latter method is contemplated, a little fine soil should be early sprinkled into the tufts of young shoots, and by frequent waterings encourage an abundant rooting.

SOME GOOD VARIETIES are: *Ardwell Gem*, *Bullion*, *Mrs. E. A. Cade*, *Moseley Perfection*, yellow; *Admiral of the Blues*, *Admiration*, *Lady Agnew*, and *Archie Grant*, rich blue; *Florizel*, lilac; *J. B. Riding* and *J. H. Watson*, purplish; *Bridal Morn*, heliotrope; *Maggie Mott*, mauve; and *Blanche* and *Niobe II*, white. [E. H. J.]

Violets.—Some years ago Violet growing was a lucrative business in many market gardens in Middlesex, Kent, and Surrey, but the encroachments of the builder have driven the industry farther afield. Violets are now grown in milder parts of the kingdom, and notwithstanding the keen competition from the importations from the south of France, from

Christmas to March and April, British growers are able to secure a fairly good price for their produce, and that for bunches only about half the size of those from the Continent. The flowers are usually bunched with stalks as long as possible, and are surrounded with their own foliage. Indeed there are no Violets in the British markets to equal those from Devonshire, Cornwall, and the south of Ireland for fragrance or size. Of late years, in the neighbourhood of Skibbereen, County Cork, the Violet industry has been revived on a fairly large scale, and one grower, Mr. W. Miles, of Ballydehob, is proving that the culture on a commercial basis is quite possible. He grows his plants in well-raised beds, each about $3\frac{1}{4}$ ft. wide, placing the Violets 14 in. apart. He gets the soil as rich as possible, and gives forty loads of good stable manure to the acre. Heavy soil is opened up with sea sand, grit, or ashes. As a rule rooted runners are planted, but unrooted ones give excellent results with such varieties as "Princess of Wales" and "Luxonne". The latter variety is particularly fine, and flowers from the middle of October to the middle of April, and will stand 12 degrees of frost with impunity. Princess of Wales, however, is much more tender, and must be grown in warmer and more sheltered spots. "Admiral Avellan" is a fine purple-flowered Violet from October till March, and has leaves that are particularly valuable for bunching purposes. The blue variety, "Californian", flowers from mid-November to the end of the season. To give some idea of the freedom of the variety "Luxonne", it may be mentioned that Mr. Miles picked 7000 blooms in one week from $\frac{1}{4}$ ac. of ground one winter when 14 degrees of frost were registered one night and 7 degrees the following one.

To secure the best Violets the soil should be rich and well drained and of a sandy loam. Large quantities of well-decayed manure should be worked in each year, and if the soil is trenched about every fourth or fifth year the tilth and temperature will be greatly improved. Cuttings or runners should be taken early in spring from the best and most free-flowering plants. Rooted cuttings or runners, if planted at 14 in. apart, will give about 30,000 plants to the acre, and under favourable conditions from 20,000 to 30,000 blooms may be picked weekly from such an area. The size of the bunches will depend, of course, upon the number of flowers put in them. Early in the season, perhaps, there will be only a dozen flowers to a bunch, and they may realize from 1s. to 1s. 6d., or even more, per dozen bunches. After Christmas, however, it may be necessary to put two dozen, or even three dozen, blooms in a bunch, and perhaps the price then will be as low as 6d. to 9d. per dozen bunches. Assuming that 30,000 Violet plants to the acre will each produce three dozen flowers during the season, a total of 1,080,000 (or 90,000 dozen) blooms will represent the crop. Taking two dozen flowers to a bunch, we have 45,000 bunches of Violets to the acre; and taking an average price of $\frac{1}{2}$ d. per bunch (or 6d. per dozen bunches), the gross receipts come to about £94. From this, however, must be deducted: rent and rates, say £4; manure, £5; digging and planting, £4; hoeing, £3; picking, bunching, and packing,

£25—making a total expense of £42 per acre, thus leaving £52 per acre for the grower. It would be well, however, to deduct 25 per cent from this for commission and contingencies, leaving a net profit of £39 per acre. So far as cultural details are concerned, the most important is to use the hoe as frequently as possible during the season, especially during a very hot and dry one, to keep the Red Spider at bay. This is also probably the best preventive against attacks of Violet Rust, caused by the fungus *Puccinia violæ*.

Besides the varieties mentioned above, the following are also worth noting: *Marie Louise*, rich lavender blue; *Lady Hume Campbell*, later and deeper in colour; *Neapolitan*, lavender with a white eye, among the doubles; and *La France* and the *Czar* among the single-flowered kinds.

Where frames, lights, and cloches are in use, in conjunction with hot-beds arranged as for the French system of intensive cultivation (see Vol. IV), there is no doubt that Violet growing could be made a more remunerative industry than at present in many parts of the kingdom.

Violets are grown in Worcestershire by the advanced type of commercial gardener. They are grown on narrow beds and borders, and the writer has seen the ladies bunching them at home in the evening. When they realize 8d. per dozen bunches and upward they are very satisfactory. Violets should be divided and replanted every spring, and the border should not be a dry one, either through adjacent trees or naturally, because Red Spider is sure to attack and spoil the plants during summer under those conditions. [J. U.]

Wahlenbergia saxicola (NEW ZEALAND BLUEBELL).—A pretty rock plant, 6 in. high, with creeping habit, tufts of spoon-shaped leaves, and drooping white flowers veined with blue from June to September. Other species are *dalmatica*, *graminifolia*, *Pumilio*, *serpyllifolia*, &c., with violet or purple flowers, and all about 3 or 4 in. high. Increased by seeds.

Waitzia aurea.—A pretty Australian annual “everlasting”, 1-1½ ft. high, with rosettes of narrow leaves, and loose clusters of shining golden-yellow flower heads in summer. It is raised from seeds sown in heat in spring, and may be planted out in early summer. See “Everlastings”, p. 41.

Wallflowers (*Cheiranthus Cheiri*).—The Wallflower, like good wine, needs no bush, and is esteemed for simplicity of culture, though most of all because of its fragrance and adaptability to British gardens. In short, it is one of the oldest and sweetest of garden flowers.

Its cultural requirements are simple enough, the plant delighting in poor and stony soils as opposed to those of much better quality. Hence the cheapest land available is suited to this crop; and because of the ease with which the plant is raised, and the cheap rate at which both plants and flowers are sold, this important fact should be kept in view by the commercial gardener.

Sow the seeds out-of-doors in April, transplant the seedlings, as soon as large enough, to nursery beds, and finally, in September, transfer them



WOMEN PICKING WALLFLOWER ON MR. BARNFIELD'S FRUIT AND FLOWER FARM
AT FELTHAM, MIDDLESEX



BUNCHING AND PACKING WALLFLOWERS FOR MARKET

PHOTOS, CHAS. L. CLARKE

to the open field or nursery quarters. In large degree the plants may be grown under fruit trees or at field margins, where land is less generally well tilled. On chalk soils the plant is quite at home. It is a mistake to allow the seedlings too long in the seedbed. The Wallflower, being a taprooting subject, if left too long, is robbed of its root fibres, and makes but little subsequent progress.

VARIETIES.—Wallflowers may be had in dwarf or tall varieties, though *Harbinger*, *Fire King*, *Belvoir Castle*, and *Eastern Queen* are among the best. Planted at 1 ft. apart or rather less, an acre would contain nearly 50,000 plants, which, at 2s. per 100, or, say, 16s. per 1000, would yield roughly about £40. Allowing of this amount £10 for culture, a good margin still remains for rent, rates, &c., and—profit. In any case it is a crop to grow, owing to its great popularity with all classes. [E. H. J.]

Gillies, or Wallflowers, are a standard and reliable catch crop or undercrop in the Evesham district, and a large quantity are grown. They are valuable aids to keeping the balance on the right side of the ledger, and the cost of production is very small. Sometimes the seed is sown where the plants are to flower, and they are thinned accordingly. Others are planted out from the seed bed; but in all cases the bulk of them are grown under the Plum trees. As early flowers are most valuable the seed must be sown early, February being the usual time. Usually Wallflowers come into flower in about twelve months from the sowing of the seed; that is, they *commence* to flower in that period. Therefore those who wish to have them in flower in April should sow the seed in April; those who wish to have Wallflowers in February and March must sow much earlier, then they will not be disappointed in ordinary seasons.

[J. U.]

Water Lily
(*NYPHÆA*).—Of all water plants there are none so popular as the hardy *Nymphaeas* and the many glorious hybrids that have been raised of late years, and of



Fig. 254.—Water Lily (*Nymphaea alba*)

which detailed descriptions will be found in *The Bulb Book*. The trade is confined to the rootstocks in spring, and besides the pure white-flowered common Water Lily (*N. alba*, fig. 254) there are varieties now with rose,

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cream, pink, crimson, pale and deep yellow, and other shades, all charming. The common British "Brandy Bottle" (*Nuphar luteum*) is also dealt in, but the trade in the tropical kinds like *amazonum* (or *ampla*), white; *devoniensis*, rose; *Lotus*, red and white; *stellata*, blue; *gigantea*, blue; and others is somewhat restricted. The *Marliacea* hybrids are the most popular, and open-air water gardens are being developed in many large private places and public parks and gardens.

Zauschneria californica (fig. 255).—A charming Californian perennial, 1-1½ ft. high, with narrow lance-shaped leaves and drooping tubular



Fig. 255.—*Zauschneria californica*

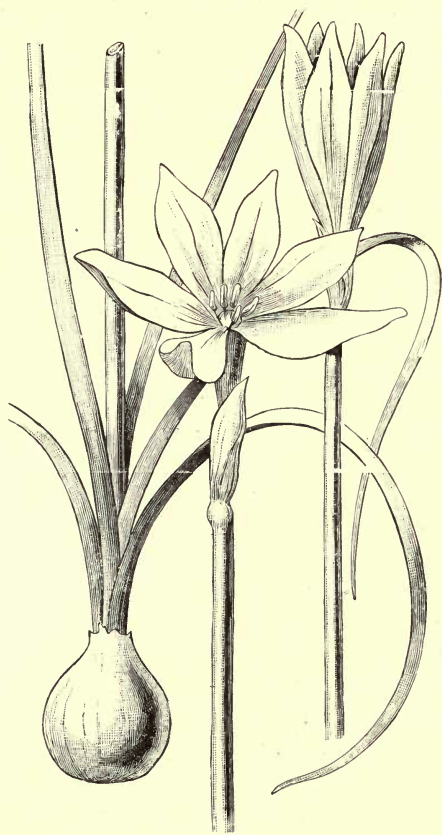


Fig. 256.—*Zephyranthes candida*

crimson-red flowers in autumn. It may be raised from seeds, cuttings, or division in spring, and is grown by nurserymen chiefly as a rock-garden and border plant. It is perfectly hardy, but prefers a sunny position.

Zea Mays (MAIZE or INDIAN CORN).—An ornamental grass, 3-4 ft. high, with broad, gracefully arching leaves, which are green in the common form, but beautifully variegated in another. The female flowers give rise to the cylindrical or conelike masses of fruit popularly known as "cobs", which are not only useful as food, but are also ornamental

on the plant, and in a dried state. Both green and variegated forms, but especially the latter, are grown for bedding-out purposes. They are raised from seeds sown in heat in March, the young plants being hardened off and fit for sale in May and June.

Zephyranthes (ZEPHYR FLOWER).—A genus of Amaryllidaceous bulbous plants from North America and the West Indies, not very extensively grown outside botanic gardens. They require warm sheltered spots in favourable places, and greenhouse protection in bleak localities. There are over thirty species known, amongst the best being *Andersoni*, yellow and red; *Atamasco*, white; *candida*, white (fig. 256); *carinata*, rose pink; *rosea*, bright rose; *Treatiæ*, white.

Zinnia elegans.—A fine Mexican half-hardy annual, 1-2 ft. high, with ovate, stem-clasping leaves and single and double flower heads of various colours, such as scarlet, vermilion, crimson, carmine, rose, white, buff, yellow, &c. There are now many fine garden varieties, the result of careful selection and hybridization, the flower heads in many cases being beautifully symmetrical in shape. The dwarf Pompon or Lilliput varieties grow only from 6-12 in. high, and are very effective "bedders". *Z. Haageana* has brilliant-orange flower heads with single and double forms.

The Zinnias are raised from seed sown in February and March in the same way as the Ten-week Stocks and China Asters, and are sold in shallow boxes or pots in April, May, and June for bedding-out purposes. They are wonderfully effective when grown in rich soil in sunny situations (fig. 257).



Fig. 257.—Zinnia

SECTION XIII

Stove and Greenhouse Plants and Flowers

Abutilon.—Though well-flowered, well-furnished plants sell readily, it is, generally speaking, as cut flowers that Abutilons are most remunerative. The plants are readily raised from cuttings kept close and in a gentle heat during the spring months. Shifted in time into 5-in. pots these plants may be grown outside during the summer months. As they come into flower they can then be disposed of. There being a fair demand for standard plants of all kinds, a few Abutilons grown in this way may prove very remunerative. As cut flowers there is a deal of the "cut and come again" character about Abutilons. In a temperature of 50° to 65° F. the Abutilons will bloom throughout the winter, particularly if the flowers are picked as they develop. The plants may be trained to a back wall, pillars, or on any spare portion of the roof. They grow freely, and an occasional stimulant is of great help to them. The selection of varieties is an important matter, as there are so many with flowers of a poor undecided tint which are practically useless from a commercial point of view. White flowers are always in demand, the best of this colour being the old *Boule de Neige*, while *Golden Fleece* is a good clear yellow. One of the best pinks is *rosaeflorum*, and of the reds *Sanglant*. The grower for market always needs to keep an eye on the vagaries of fashion, as colours popular one year may be almost unsaleable the next. Still, good whites and yellows may be grown with confidence. One of the best silver variegated kinds is *Savitzzi*, and another is *Souvenir de Bonn*, while *Thompsoni* and *vezillarium variegatum* are amongst the best, with yellow mottled leaves. [w. t.]

Acacia.—Of this extensive genus only a very few are available for market culture, as the majority of them must attain tree-like dimensions before they flower well. A case in point is furnished by *A. dealbata*, the "Mimosa" of florists' shops. If this could be flowered in a small state there would be a great demand. The best of the Acacias for this purpose are *armata*, *cordata*, *Drummondii*, *grandis*, *ovata* (or *obliqua*), and *verticillata*.

Acacias need more care in their propagation than the bulk of plants commonly grown for market. They are increased by cuttings of the

half-ripened shoots, taken during the spring or early summer, and inserted into well-drained pots of sandy soil. They must be kept close and shaded either under a bell glass or in a close propagating case. During the earlier stages they make more headway in a structure warmer than an ordinary greenhouse. When rooted and hardened off these *Acacias* should be potted singly into small pots, using a mixture of loam, peat, and sand. - For *cordata* and *Drummondii* an additional allowance of peat is beneficial. Directly the roots take hold of the new soil the tops of the plants should be pinched out in order to encourage a bushy habit. These *Acacias* flower during the spring months, and as those which are struck one spring are too small for sale the next, they are as a rule kept for two years. The more vigorous examples are then established specimens in 5-in. or 6-in. pots.

From the length of time necessary to get well-furnished plants, *Acacias* of course realize higher prices than quicker-growing subjects. As they flower naturally in a greenhouse temperature they may be used for decorative purposes in places where other plants grown in greater heat would quickly suffer. Seeds of some kinds can be occasionally obtained, but plants raised in this way do not flower so freely in a young state as those propagated from cuttings. One species, *lophantha*, is grown for its pretty Fern-like leaves. This may be increased from seeds sown in heat in early spring, and the young plants so obtained make rapid progress afterwards. It is much used as a "dot" plant in summer bedding. [W. T.]

Acalypha.—These are cultivated chiefly for their ornamental foliage, and are now becoming fairly popular for producing sub-tropical effects during the summer months. The leaves resemble those of large limes or elms, being toothed on the margin, and varying from a deep bronze to crimson brown in colour, and in one case (*A. marginata*) having the edges coloured carmine. The individual blossoms are inconspicuous, but in the case of *A. hispida* (or *Sanderi*) (fig. 258) they are produced in great profusion, drooping spikes 18 to 24 in. long, resembling bell-pulls, or huge bright-crimson hairy caterpillars. Other species are *Chantrieri*, *Godseffiana*, *Wilkesiana* (or *tricolor*), *Macafeana*, *macrophylla*, *musaica*, *obovata*,



Fig. 258.—*Acalypha Sanderi*

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and *triumphans*—all natives of Polynesia, the New Hebrides, &c. They are all easily raised from cuttings of the young shoots or from eyes inserted in sandy soil in spring in a temperature of 70° to 80° F., and kept close, moist, and shaded for a time. When well rooted they are potted up and grown on in a cooler temperature, and allowed plenty of sunlight to develop the colour. Plants attain a large size, but small subjects in 5-in. or 6-in. pots are best for sale. They like plenty of moisture during growth, and copious syringings.

Achimenes.—These were more extensively grown some years ago than at present, but there is still a large demand for them for the decoration of conservatories, &c. The numerous hybrid varieties are far superior to the native South American species from which they have sprung. The catkin-like tubers are potted up in rich sandy soil, or leaf cuttings may be rooted readily to increase the stock. A stove temperature and treatment is best, the plants being in season from spring till autumn, and then taking a rest.

Agapanthus umbellatus.—This well-known fleshy-rooted African plant is almost hardy, and is usually grown in tubs in any garden soil out-of-doors during the summer, and protected in greenhouses or sheds during the winter. It has long leathery strap-shaped leaves and large umbels of bright-blue flowers during the summer and autumn. There are many varieties, such as *albidus*, white; *Leichtlini*, deep blue; *maximus*, large, blue; *flore pleno*, double; *minor* and *Mooreanus*, both small and compact; *bicolor*, blue and white; *Weillighi*, lavender; and *argenteus*, with silver-striped leaves.

Agathæa cœlestis.—A pretty South African Composite, known as the "Blue Marguerite", owing to its blue aster- or daisy-like heads of blossom. It flourishes in a loamy soil with a little sand and leaf mould, and may be raised from cuttings of the half-ripened shoots almost at any time. It is often bedded out in summer. The variegated form is valuable for carpet bedding, as the leaves lie close to the ground.

Agave.—The American Aloe or Century Plant (*A. americana*) is well known as a decorative subject in large tubs for



Fig. 259.—*Agave americana*

outdoor decoration in summer, the variegated form with rich creamy-yellow stripes being most popular. In a small state young plants find a fairly good sale during the year. They are easily grown in a mixture of loam and old mortar rubble; and require but little water and attention, but must have plenty of sunlight. They may be raised by detaching suckers from the base of the old plants (fig. 259).

Ageratum mexicanum.—This dwarf Mexican Composite is valued for bedding out in summer, and is easily raised from seeds sown early in spring or from cuttings. The fluffy flower-heads vary from pale to very deep blue, but there is also a white-flowered variety. Any good garden soil will suit.

Allamanda.—Splendid South American trailing plants with smooth leaves and tubular bell-shaped yellow flowers. The best-known kinds are *Hendersoni* and *grandiflora*, the former having very large blooms. Others are *nobilis*, *Schotti*, *Aubleti*, *Chelsoni*, *neriifolia* (a bushy plant), and *verticillata*, all yellow flowered; while *violacea* is a rare species with violet-rose flowers. Allamandas are easily grown in sandy loam in a warm and moist house, and may be raised from cuttings of the young half-ripened shoots.

Alocasia.—These plants are chiefly valuable for their large, coloured, and variegated leaves, some as much as a yard from top to bottom, and are more or less oval triangular in shape with a deep sinus at the base. The under surface is generally distinct in colour from the upper, while the leaf stalks in many cases are beautifully marked or blotched with different colours. The true species are natives of the Malayan Archipelago and tropical America, but there are many very fine hybrids now in commerce. They like plenty of heat and moisture, and rich organic but well-drained soil, and may be increased by offsets from the old stools in spring.

Aloe.—Out of nearly 100 species only a few are grown in any quantity—the most popular being the South African *A. variegata*, the well-known “partridge-breasted” Aloe. The stout leaves 6–8 in. long are deep green spotted with grey and edged and keeled with white. It is easily grown in loam and mortar rubble in a greenhouse, and is increased by offsets from the base.

Aloysia (Lippia) citriodora.—This is the well-known lemon-scented Verbena, a native of Chili. It is a shrubby plant with pale-green lance-shaped leaves remarkable for their deliciously fragrant scent. It was at one time grown in hundreds of thousands from cuttings of the young shoots in the same way as Fuchsias, but dropped down considerably of late years. There is, however, a revival in its trade, and nice bushy plants in 3½-in. and 5-in. pots find a ready sale. Older plants grown as bushes or standards are also in request. Growers should encourage florists to use shoots with cut flowers, but the plants must be grown hard for this purpose, otherwise the shoots are apt to wither too soon.

Alpinia vittata.—A Gingerwort from the South Sea Islands having stems about a yard high furnished with pale-green lance-shaped leaves striped with creamy white. Small specimens are likely to sell best. They

require warm-house treatment, and a rich loamy soil, and are increased by division of the rootstock in spring.

Alternanthera.—This is one of the most useful and popular carpet-bedding plants. It forms a dense carpet of coloured foliage and may be clipped and pinched without injury during the season to keep it in order. Thousands of cuttings are taken from the old stocks in spring and inserted in sandy soil in pots or shallow boxes, placed in a good hotbed or in cutting frames under glass about February and March. The young plants are potted up or placed in shallow wooden boxes and allowed plenty of light to develop the colour, and harden them off. Amongst the best kinds are: *amabilis*, ovate purplish-green leaves changing to brilliant orange red; the variety *latifolia* has larger and broader leaves and brighter colours; *amæna* has narrow lance-shaped leaves of a rich carmine colour; in *spectabilis* the young leaves have a decided magenta shade; *magnifica*, orange red; *tricolor*, green at the edges, rose pink in the centre traversed with purple veins, and with a yellow band between the centre and edges. *A. paronychioides* has the young leaves flushed with scarlet and bronze; *major* is a stronger form with brighter-tinted foliage, which in the sub-variety *aurea* is deep yellow and red, and shows up well in hot seasons; *nana aurea* is a very compact grower with yellow leaves; and *versicolor* has bright-rose and purple foliage suffused with bronze. The *Alternantheras* are natives of Brazil, and belong to the *Amaranthus* or Cock's Comb family.

Anthurium.—Anthuriums, like Alocasias, are chiefly grown for their ornamental foliage, some of the best kinds for this purpose being *crystallinum*, *magnificum*, *Warocqueanum*, and *Veitchi*—the latter being remarkable for its velvety deep-green and wrinkled leaves 3-4 ft. long. The most popular for market purposes, however, are *A. Scherzerianum* and *A. Andreanum*, both having brilliant scarlet spathes. The first-named is most popular because it is more easily grown and raised. It is known as the "Flamingo Plant", and is a native of Costa Rica. Numerous seedling forms are now in existence, varying in colour from almost pure white, as in *album*, to the deepest crimson scarlet, many varieties having the spathes beautifully mottled with white. In the variety *Rothschildianum* the spathes are white mottled with red. *A. Lindenii* is a tall-growing white-spathed plant having large heart-shaped leaves, and many hybrid forms have been raised by crossing it with *A. Andreanum* and *A. Scherzerianum*. Anthuriums require stove treatment, and flourish in a compost of loam and peat with a little chopped sphagnum moss and a few nodules of charcoal. The atmosphere should be kept humid yet buoyant during active growth, and plenty of water or copious syringing is also necessary. Stock is raised from seeds sown when ripe, and by dividing the tufts.

Aralia.—A mixed genus of stove, greenhouse, and hardy ornamental-leaved plants of a more or less shrubby habit when fully grown. The best-known stove kinds are *A. elegantissima*, *A. Guilfoylei*, *A. Veitchi*

and its slender variety *gracillima*, *A. Chabrieri*, *A. Kerchoveana*, and *A. leptophylla*. These are all natives of New Caledonia and the South Sea Islands, and flourish in sandy loam, peat, and leaf mould, in a warm, moist atmosphere. The leaves being deeply divided and graceful form the chief attraction of these plants, which are usually raised from cuttings in cases, and by means of grafting.

The plant known as *Aralia Sieboldi* or *Fatsia japonica* is a Japanese plant, quite hardy in the milder parts of the United Kingdom, where it becomes a large and ornamental shrub. As a pot plant it is raised in thousands every year under glass from seeds, and is sold in 2½-in. to 5-in. pots, fetching from 6s. to 9s. per dozen in the latter size. The seeds are usually sown in shallow boxes or in beds in sandy loam and leaf soil in a temperature of 65° to 75° F., the seedlings being afterwards potted up singly and grown on in various sizes according to the object in view. There are several attractive forms, variegated or blotched with gold or silver, but the green-leaved type and one called *Moseri* are the most popular for market work, and the trade is continuous. Tall plants may have the heads taken off as cuttings if necessary.

Araucaria excelsa (NORFOLK ISLAND PINE).—This is certainly the most graceful of all the Araucarias, and although it attains a height of 100 ft. and more in its native habitat, it is admirably adapted for pot culture in a small state, and thousands are now grown every year in 5-in. and 6-in. pots, and even in larger sizes. The plants thrive in a fibrous yellow loam with a sprinkling of sand and some leaf mould, and require only a greenhouse temperature when established. They are raised from cuttings having



Fig. 260.—*Araucaria excelsa*

about two whorls of branches. These are inserted in rich gritty soil with bottom heat and are kept close and somewhat shaded till rooted, after which they are potted up singly and grown on for sale. Plants in 5-in. pots realize from 18s. to 21s. There are now varieties of golden hue, and also one called "Silver Star" with silvery-tipped branchlets (fig. 260).

Ardisia crenulata.—A pretty evergreen West Indian plant likely to

become popular as a winter-berried plant. It makes a compact bushy plant in 5-in. and 6-in. pots, and grows freely in sandy loam and leaf mould in a stove or warm greenhouse. The most attractive feature consists in the bright scarlet berries, which are about the size of Hawthorn fruits and remind one very much of them. The plants are readily increased either from seeds sown when ripe in rich gritty soil, and in a temperature of about 70° F., or from cuttings of the half-ripened shoots. There is a white-berried variety called *alba*.

Aristolochia elegans.—A handsome climber with creamy-white flowers heavily blotched with purple. It grows freely in a warm greenhouse and is almost hardy in the mildest parts. Raised from seeds or cuttings. There are many other kinds, the best known being *Goldieana*, with very large flowers yellow inside blotched with chocolate brown; *Sturtevantii* has large creamy-white and brown flowers; *ornithocephala* has yellow and brown flowers, and *ridicula* is a curious plant with purple-brown ear-like lobes veined with white. The "Dutchman's Pipe" is a hardy species with large soft green leaves and small greenish flowers. It grows to a great length, and flourishes in ordinary good soil.

Arum Lilies or Callas.—Under these names *Richardia æthiopica* or *R. africana* is best known to the trade. It is a tuberous-rooted plant, 2-3 ft. high, with large green broadly arrow-shaped leaves, and is highly esteemed as a market plant on account of its large pure-white bell-shaped spathes, popularly known as "flowers". Arum Lilies are chiefly remunerative at Christmas and Easter time when they are in much request. To have the plants in flower for Christmas, the rootstocks should be potted up afresh in July or August. They may be left in the open air till September, when it becomes advisable to place them under glass. A temperature of 55° F. by night and 60° F. by day will suit the plants until about the middle of November. The temperature should be regular and not fluctuating too much by day and night, as nothing interferes with the development of the spathes so much as an irregular temperature at this period. From the middle of November onwards the temperature may be raised to about 70° F. by night and 75° F. by day, and the plants may be kept clean by occasional syringings with tepid water. In the event of aphides appearing a quassia and nicotine solution may be used for syringing, or the houses may be fumigated or vaporized.

A rich gritty loam with a little leaf mould or well-rotted manure suits Arum Lilies well. The pots should not be too large—5 in. or 6 in. being the sizes most favoured. Stock is readily increased when repotting by detaching all offsets and potting up separately into pots according to size. When flowering is over, the plants may be moved to cooler quarters, and when all danger from frost is over in spring they may be placed out-of-doors in warm sunny spots to rest. Many growers plant them out of the pots in the open ground during the summer; others leave them in the pots, and excellent results are produced by both methods. In the mildest parts of the kingdom, such as Cornwall, the Scilly Islands, and the south and



ARUM LILIES GROWN FOR MARKET BY THE EDITOR



AZALEA MOLLIS FORCED INTO EARLY BLOOM FOR MARKET

west of Ireland, Arum Lilies may be grown in the open air all the year round. Besides the ordinary variety there is a dwarf-growing form called "Little Gem", and another called "Childsi"—both much smaller than the type. There is also a strong-growing variety called *Nicolai*, $4\frac{1}{2}$ –5 ft. high, which has spathes 1 ft. or more across—probably much too large to be popular with market growers.

Next to the white Arum Lily, the yellow-flowered one called *Elliottiana* (fig. 261) is most extensively grown—more by nurserymen, however, than by market men. It resembles the ordinary form in shape and size, but the leaves are decorated with silvery semi-translucent blotches, and the spathes are of a bright golden yellow. It requires to be grown in greater heat, and is readily reproduced from seeds, from which flowering plants develop in about three years. There are several other *Richardias*, but they are chiefly grown in small numbers for private trade.

Asparagus.—There are many species of *Asparagus*, but the most valuable for market purposes are the feathery *A. plumosus* and its flat variety *nanus*; *A. Sprengeri* and *A. medeoloides*. The latter is far better known in the florist trade as "Smilax"—a quite distinct genus.

A. plumosus and its variety *nanus* are both climbing South African plants, with graceful needle-like foliage, highly valued by florists for mixing with floral emblems of every description. Both kinds should be grown in a warm greenhouse or stove in loamy soil with a little sand and leaf mould. For market work large airy houses are best, and wires or strings should be fixed for tying the stems.

A. Sprengeri, from Natal, is now extensively grown in 5-in. and 6-in. pots, or in baskets for hanging work, but its trails, 3–4 ft. long, are also used largely in floral work. It may be grown under conditions similar to those of *A. plumosus*, plants in 5-in. pots realizing from 10s. to 12s. per dozen. The long trails of *A. plumosus* and *nanus* fetch about 1s. 6d. to 2s. per half-dozen, while shorter pieces realize from 12s. to 18s. per dozen bunches.

The "Smilax" (*A. medeoloides* or *Myrsiphyllum asparagoides*) is a popular market plant. It is grown in pots or in beds like *A. plumosus*, the slender trailing stems, with Myrtle-like leaves, being twined round



Fig. 261.—*Richardia Elliottiana*

slender strings arranged vertically to the rafters or cross-wires. Long trails realize about 1s. 3d. to 1s. 6d. per half-dozen. The species mentioned are all best raised from seed sown as soon as ripe in a temperature of 70° F.

Aspidistra (PARLOUR PALM).—The green-leaved and variegated form of *A. lurida* are ever-popular market plants, specimens in 5-in. and 6-in. pots realizing from 20s. to 30s. per dozen—the variegated forms, in which the leaves are striped with yellow and white, fetching twice as much as a rule. To secure fine foliage plants a stove or warm greenhouse tempera-

ture and plenty of moisture are necessary during active growth. The plants should also be frequently syringed to keep the foliage clean and bright and free from Red Spider, thrips, Mealy Bug, and scale. A good rich loamy soil, with a little sand and leaf mould, should be used for potting. Propagation is effected by cutting the rhizomes into pieces, potting them up, and plunging in a brisk bottom heat with plenty of moisture until well established. Before taking to market the plants are usually hardened off in a lower temperature.

Azalea indica.—Although cultivated by the Dutch as long ago as 1680, this species, which covers every hill and mountain in Central and Southern China, was only taken seriously in hand by nurserymen about eighty years ago.

Since that time innumerable varieties, double and single flowered, have been evolved, and hundreds of thousands of plants are now raised annually in the Dutch, French, and Belgian nurseries for export to Britain, America, and other parts of the world. It is curious that while in British nurseries the custom is to pot the plants very hard in a peaty compost, the reverse is the case in Continental nurseries, where the plants are grown magnificently in a loose peaty mould in frames, and in the open air during the summer months. The named varieties are usually grafted on common stocks, which are themselves raised from seeds or cuttings. Nice bushy plants, suitable for 3-in., 5-in., and 6-in. pots, are now readily obtainable for winter blooming, and a good trade is done in them just before Christmas and afterwards well into March and April. The blooms are very beautiful, and vary in colour from the purest white to the deepest scarlet and crimson



Fig. 262.—Double Azalea (Deutsche Perle)

through shades of purple, many varieties being gorgeously striped or spotted with other quite distinct shades. Amongst the most popular coloured varieties the following may be mentioned: *Apollo*, bright red, semi-double; *Marc Rouman d'Ertbuer*, deep crimson, double; *Flambeau*, magenta red; *Ferdinand Kegeljan*, deep rose, upper petal speckled; *Marquis of Lorne*, bright fiery red; *Comtesse de Flandres*, magenta rose, very large; *Anna Klein*, double white, sometimes splashed and spotted with red; *Alexander II*, blush, speckled crimson; *Prof. Walters*, blush white, upper petal speckled deep rose; *Oberst von Kutsinsky*, scarlet, double; *Spitfire*, brilliant crimson scarlet, double; *Theodore Riemers*, clear magenta purple, double; *Vervæneana*, double white, rose centre, upper petal heavily blotched with crimson; *Eclair*, deep brilliant crimson; *Lady Roosevelt*, clear flesh pink, semi-double; *Rudolf Seidel*, deep flesh pink, splashed with crimson.

For cut flowers some growers still grow large specimen plants of the old "Felder's White" Azalea—a beautifully pure-white single-flowered form. Quite large plants, from 3-8 ft. high, are grown in pots or tubs, and are forced into early bloom for Christmas and onwards. The flowers are bunched up in dozens, two or three on a stalk cut as long as possible, each individual bloom being gummed beforehand. After standing in water



Fig. 263.—*Azalea indica*, single

for an hour or two, the flowers are carefully packed in shallow boxes and protected with tissue paper. Sometimes they realize good prices, from 3s. to 6s. per dozen bunches, but at other times they are a drug in the market. For wreath work and funeral emblems generally, this pure-white Azalea is difficult to beat. Other good white varieties are *alba*, *alba magna*, and *magnifique*.

Amongst the double whites useful for the cut-flower trade are *Deutsche Perle* (fig. 262), *Borsig*, *narcissiflora*, *Flag of Truce*, *Madeleine*, *Reine de Portugal*, *Bernard Andrea alba*, *Eros*, *Niobe*, *Sakountala*, &c. (See also fig. 263.)

After Azaleas have finished flowering they should be pruned and thinned out, and then grown on in a warm greenhouse temperature and well syringed in the morning and afternoon, in addition to giving fair

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supplies of water to the sandy and peaty compost in which they should be grown and firmly potted. In this way long clean shoots are made early in the year, and by the end of May or by the middle of June the plants may be stood out in the open air till about September or until there is a danger of frost. During the summer months the plants must be watered thoroughly when necessary, and each day should also be well syringed early in the morning and late in the afternoon to encourage and ripen the growth, and to prevent attacks of Red Spider and thrips—pests that are likely to be very troublesome in hot dry seasons.

Under glass the plants, if afflicted, should be fumigated or vaporized two or three evenings in succession to free them from pests or to prevent attack. Old plants may be grown in the same soil for many years in succession, and if supplied with weak liquid manure water when the buds are swelling they will yield enormous crops of bloom.

Azaleas flourish in sandy loam or peat, but the latter is generally preferred. M. Georges Truffaut, who has paid special attention to the chemical composition of the Indian Azalea and the soil in which it grows best in parts of France and Belgium, gives the following figures for four kinds of Continental leaf mould:—

	Leaf-mould from Rambouillet.	Leaf-mould from Maurepas.	Peat-mould from Maurepas.	Leaf-mould from Ghent.
Quantity of Fine Mould in 1000 lb. bulk,	800	615	730	590
Nitrogen	5.9	4.7	5.0	11.7
Phosphoric acid	1.2	1.3	0.6	1.6
Lime	2.6	1.8	1.9	3.5
Potash	3.5	5.0	3.1	1.4
Silica	836.0	805.5	790.5	341.0
Iron oxide	—	1.7	2.6	—
Organic matter	95.3	170.0	188.0	640.0

It will be noticed that the Ghent leaf mould, which is famous for Azalea culture, is more abundant in nitrogen, lime, and organic matter than the other samples, and this may give a clue to mixing up a suitable compost. Analysis of the ash of the different parts of an Azalea give the following figures:—

	Potash.	Phosphoric Acid.	Lime.	Iron Oxide.	Silica.
	per cent.	per cent.	per cent.	per cent.	per cent.
Leaves	8.88	6.88	18.90	0.12	46.00
Stems	14.20	5.76	21.72	0.12	27.20
Roots	8.29	3.20	2.13	0.10	78.00

From these it may be inferred that the practice of adding sharp sand



RHODODENDRONS AS GROWN IN NURSERIES



INDIAN AZALEAS AND MYRTLES UNDER GLASS

to Azalea compost is justified by the amount of silica taken up by all parts of the plant.

There is one point to remember about potting, that is, never to use pots larger than necessary. Quite large-headed plants full of bloom may be grown well in 3-in., 5-in., and 6-in. pots, and for market work it is a consideration not to have too great a weight to carry.

Balsams.—Under this name many fine strains of *Impatiens Balsamina* were cultivated some years ago in thousands for market, and were chiefly valued for summer bedding out. The Balsam, being an annual, is raised from seed sown in heat in February and March in pots, pans, or boxes, the seedlings being afterwards pricked out and grown on singly in pots or several in boxes. They require plenty of moisture during growth, being exceedingly fleshy in texture, and in the early part of the year a temperature up to 70° F. is necessary by day to make them develop quickly into sturdy bushy plants. They are exceedingly free in blossom, the double-flowered kinds being also very handsome.

Begonia.—There are now three or four distinct classes of Begonia, namely the tuberous-rooted, the fibrous-rooted, the winter-flowering, the ornamental-leaved or Rex varieties, and several species and hybrids.

TUBEROUS BEGONIAS.—These originated from *B. boliviensis*, *B. Pearcei*, *B. rosæflora*, *B. Clarkei*, *B.*

Veitchi, and *B. Davisi*, the first-named having been introduced from Bolivia in 1857, the last-named in 1876. Of these *B. Pearcei* is the only one having yellow flowers, the others being rose or crimson. In all cases the flowers are small and more or less drooping, and quite insignificant in comparison with those of the modern florists' Begonia, many of which have flowers from 6 to 9 in. across. Magnificent shades of colour have also been evolved by hybridization, selection, and cross fertilization, and there are now all colours, varying from the purest of whites through pink and purple to the deepest scarlet and crimson; while clear-yellow, primrose, and orange shades also abound. There are also single- and double-flowered varieties (figs. 264, 265), some with plain edges, others crimped and frilled, and others again with crests on the face of the petals.



Fig. 264.—Tuberous Begonia, single

And all this wonderful work has been accomplished practically within the past forty or fifty years. Some thirty years ago varieties called *Weltoniensis* and *Saundersi*, both with pink flowers, were grown largely for market, but they have long since been superseded by improved strains which are sturdier in habit and more free in blossom.

For bedding out during the summer months tuberous Begonias are particularly well suited, and as their original parents above-mentioned came from an elevation of 11,000 to 13,000 ft., they are as hardy as the Dahlia.



Fig. 265.—Tuberous Begonia, double

They are ornamental in foliage, the large somewhat irregularly lobed and coarsely toothed leaves being larger on one side of the midrib than the other, and of a deep glossy green. On the whole they are more easily raised and more quickly grown than the Zonal Pelargonium, and they possess the great advantage that the tubers can be stored away in frost-proof lofts or cellars during the winter months until wanted to start into growth in the spring.

The simplest method of raising a stock of tuberous Begonias is from seed. This is small and like grains of brown dust. It should be sown in January or February, on the surface of a light sandy compost in a temperature of 70° F. by night and 75° to 80° F. by day. The little seedlings

are pricked out when the seed leaves are well developed, with a pointed stick into a similar compost, being spaced out about $\frac{1}{2}$ in. apart. They are carefully watered and protected from strong sunshine until established, and they grow rapidly in the temperature mentioned. When large enough to handle easily, the young plants are then transferred singly to 3-in. pots, using a compost of good turfy loam, to which may be added about one-third of leaf mould or well-rotted manure from a hotbed or mushroom bed, and a good dash of coarse sand. A similar temperature may be still maintained, and the plants should be watered carefully and sprinkled overhead daily to encourage rapid growth. By the middle or end of April they will have attained a fair size, and the temperature may then

be gradually reduced, and more air and light given to harden the plants off for sale in May and June. Seedlings the first year even will develop tubers about 1 in. in diameter. Any plant not sold may be planted out for stock in some part of the garden, and the tubers will serve to produce an early crop the following season.

A great trade is done by nurserymen in the tubers every year, and some special varieties obtain high prices. Where plants are raised annually from seeds, it is always possible that a particularly charming variety may appear, and may be worth while propagating specially from cuttings and division of the tubers.

FIBROUS-ROOTED BEGONIAS.—Of these the most remarkable is *Gloire de Lorraine* and its many varieties, which are now grown in hundreds of thousands not only in the British Islands but on the Continent and in America. To M. Lemoine, of Nancy, belongs the honour of raising the original “*Gloire de Lorraine*” by crossing the South African *B. Dregei* with *B. socotrana* from the Isle of Socotra.

The great peculiarity of the progeny of these two species is that the plants, although exceedingly free in flowering, are practically sterile, and cannot be raised from seeds. *Gloire de Lorraine* and the lovely sports from it, like *Mrs. Leopold de Rothschild*, *Rochfordi*, *amabilis*, are all raised either from leaf cuttings or stem cuttings. This work of propagation is usually carried on from February till July, a fresh batch of cuttings being put in every fortnight to secure a succession. Some growers take shoot cuttings from old cut-down plants about the first week of June, and are of opinion that they produce finer plants than those from cuttings taken in March. The cuttings in all cases are inserted in sandy soil in glass-covered cases, and are shaded from sunshine and kept nicely moistened until well rooted. This generally takes about a fortnight. The plants are then potted up singly in 2½-in. pots, from which they are later on transferred to 3-in. pots (60's), and afterwards to 5-in. pots (48's) when large enough. Some of the finer plants are moved from 3-in. to 6-in. pots straight away. At the same time old plants left over from the previous year, that have been cut down previously and made break into growth, are repotted into 8-in. and 10-in. pots according to their size. In this way large specimen plants are produced for special purposes.

A slender stake is put to each plant in 5-in. and larger-sized pots, and the shoots are tied up neatly as growth progresses. The soil used consists of turfy loam, sand, and leaf mould in about equal proportions.

It has been remarked that plants of *Gloire de Lorraine* and its varieties raised from stem or shoot cuttings usually make beautiful pyramidal shapes, while those raised purely from leaf cuttings are more globular in shape and usually more loose in habit. Some kinds, like *Mrs. Leopold de Rothschild*, appear to break more freely into growth and blossom from leaf cuttings than from stem cuttings, and thus come earlier into the market. Perhaps this variety and Messrs. Rochford's

amabilis are two of the very best for market at the present time. One may, however, anticipate new varieties of other shades, and mention may be made of one called "La Patrie", which has large leaves, and rather small but numerous flowers of an extraordinary brick-red colour. One called "The King" is something like the typical Lorraine; while another called "Concurrency" is a Continental sport of some merit.

Messrs. T. Rochford & Sons have also a remarkably free-flowering double form of Lorraine which remains in continuous blossom for six months.

The great advantage of the Lorraine Begonias as market plants is that they are readily raised from cuttings, easily grown during the summer months, flower from October to March and April, and, being so graceful in habit and pleasing in colour, they sell readily.



Fig. 266.—*Begonia Rex*

BEDDING BEGONIAS.—Quite distinct from the Tuberous and Lorraine Begonias a large trade is done in early summer in certain fibrous-rooted kinds, one of the principal being known as *semper-florens*. There are now numerous varieties of this, all easily raised from seeds or cuttings. They are dwarf and compact in habit, and produce their rather small flowers in great abundance. They are valuable for edging beds and borders, and for making a carpet

in beds beneath standard or half-standard plants like Fuchsias, Heliotropes, Abutilons, Acacias, &c., during the summer months. The foliage of some varieties assumes deep crimson or purple shades during the season, as in *Vernon* or *Crimson Gem*. Some good forms are *carminea gigantea*, *rosea gigantea*, *alba*, *Princess Beatrice*, *Duchess of Edinburgh*, *magnifica*, &c. Other fibrous-rooted Begonias useful for bedding purposes are *Abundance*, pink; *Afterglow*, rose carmine; and *ascotensis*, rose red.

WINTER-FLOWERING BEGONIAS.—Although not yet a market grower's plant, it is possible that in the course of time the beautiful varieties of winter-flowering Begonias that have been raised by crossing and inter-crossing *B. socotrana* with modern forms of the tuberous Begonia will become so. These Begonias somewhat resemble dwarf, sturdy, and compact-growing forms of the tuberous Begonia, with single, semi-double, and double flowers varying in colour from pink to deep-purple pink, rose, cerise, &c. They are all sterile, like the Lorraine section, and must therefore be raised from cuttings. Some of the best forms at present

are *Ideala*, *Adonis*, *John Heal*, *Mrs. Heal*, *Ensign*, *Winter Cheer*, *Julius*, *Venus*, *Winter Perfection*, &c.

The ornamental-leaved Begonias, like the Rex section (fig. 266), and the coloured-leaved varieties, as well as such natural species as *B. manicata*, *B. maculata*, and *B. metallica*, and some fine varieties are well-known plants. *B. incarnata* (or *insignis*) has given such remarkable forms as Arthur Mallet, M. Hardy, The Queen, and others, by crossing with the Rex section; while *B. coccinea* (or *corallina*), a tall-growing Brazilian species, is nearly always gay with its drooping panicles of blood-red blossoms.

Bertolonia.—Pretty dwarf foliage plants recognized by their deeply ribbed leaves, often conspicuously spotted with distinct colours and washed with tints of various hues. Some good kinds are *argentea*, *guttata*, *margaritacea*, *punctatissima*, *marmorata*, *superbissima*, *Van Houttei*, &c. They require stove treatment, and are raised from seeds and cuttings.

Bignonia.—A genus of stove and greenhouse climbers with showy tubular flowers. They are rampant in growth, like a peaty soil, and are increased by cuttings of the young half-ripened shoots. The stove kinds include *Chamberlayni*, yellow; *magnifica*, mauve and reddish purple; *regalis*, yellow and red; *speciosa*, pale purple; *purpurea*, rose purple; *venusta*, orange; *Cherere*, orange red. The greenhouse kinds are *Tweediana* and *Unguis*, both yellow flowered.

Boronia.—A genus of Heath-like plants with narrow leaves and cup-shaped flowers. They are natives of Australia, and prefer cool greenhouse treatment. A peaty soil with a little sand suits them best, and watering must be

carefully attended to in winter. They are propagated from cuttings, 2-3 in. long about August, in very sandy soil, and are kept moist, shaded,



Fig. 267.—*Boronia heterophylla*

and covered with bell-glasses until rooted. The best kinds are: *elator*, with rose-red flowers in dense clusters; *heterophylla* (fig. 267), bright red; *megastigma*, brown and yellow; *polygalæfolia*, rosy lilac; and *serrulata*, deep rose. They are sweet-scented, and flower during the winter season.

Bougainvillea.—There are several species, natives of tropical and subtropical America, the best known being *glabra*, *speciosa*, *Sanderiana*, and *spectabilis*—all remarkable for the large and conspicuous rosy-mauve bracts surrounding the narrow tubular flowers. The plants are usually grown as climbers, or over wire balloons, but they may be grown as bushy pot plants. They flourish in a mixture of sandy loam and peat, and are easily raised from cuttings of the half-ripened shoots inserted in sandy soil, and plunged in a hotbed with brisk bottom heat. When in flower the effect of the floral bracts is gorgeous, and of late years plants have become popular for the open flower border during the summer months. A good variety called “Maud Cheddleburgh” has appeared of late years.

Bouvardia.—Some few years ago Bouvardias were grown in very large numbers for market, some growers disposing of as many as 20,000



Fig. 268.—*Bouvardia jasminiflora*

to 30,000 plants annually. Owing to competition from other plants, however, Bouvardia culture is now more restricted. The white-flowered kinds, like the old Mexican *jasminiflora* (fig. 268), *candidissima*, *Humboldti*, and *Vreelandi* amongst the singles, and *Alfred Neuner* amongst the doubles, are particularly useful for floral work, and often find their way into wreaths, bouquets, crosses, &c.; while the scarlets, like *Dazzler*, *Hogarth*, *Scarlet Prince*, and *Vulcan*, and *President Cleveland*, crimson—all single-flowered—are also sold as cut in quantity as well as on the plants. Perhaps the best double scarlet is *Hogarth flore pleno*.

Bouvardias are grown as greenhouse plants, but are quite hardy

enough for bedding out during the summer months in the milder parts of the country. Unsold plants or those kept for stock are planted out by market growers. In early autumn they are lifted carefully and potted up for the production of blossom during the winter season. Stock is increased from cuttings of the young shoots developed from old cut-down plants in the same way as Fuchsias. They are generally started in February, being inserted in pots filled with sandy soil and placed in a close frame. The cuttings root in a few weeks, and are

then potted up singly in 3-in. pots in good sandy loam and leaf mould. The temperature at night is about 60° F., rising 5 or 10 degrees by day. The young plants are encouraged to grow quickly in the genial warmth, and are moistened overhead with the syringe in the afternoon when the ventilators are closed for the night. When large enough the plants are either transferred to 5-in. or 6-in. pots, or they may be planted out in June in nicely prepared soil in the open air. The tips of the shoots are pinched out at intervals after the first potting, to induce a good bushy habit, as this does away with the necessity of staking and tying the plants. During active growth the plants require plenty of moisture at the root, and a nice sprinkling overhead daily is also beneficial. They also like plenty of air and sunshine to ripen the growths and thus prepare them for bearing masses of bloom. Besides the varieties mentioned above, others are: *intermedia*, pink; *Laura*, rose; *Mrs. Green*, salmon; *rosea multiflora*, rose pink; *The Bride*, blush white—all single; and *President Garfield*, pink, and *Schmidt*, flesh pink—doubles.

Bromeliads.—Although a fairly large trade is done in these plants on the Continent, for some reason or another they have never become popular in British gardens. Here and there, outside botanical establishments, one may meet with a more or less bedraggled specimen of an *Æchmea*, *Billbergia*, *Caraguata*, *Tillandsia*, or a variegated form of Pine-apple (*Ananas*), but the trade in them is practically *nil*. And yet they are graceful evergreen plants with conspicuous spikes or drooping racemes of gorgeously coloured flowers and bracts. Most of them flourish in a sandy peat, require plenty of heat and moisture, and are propagated by means of suckers and from seeds.

Brunfelsia (Francisea).—A small trade is done in these shrubby plants with evergreen leathery leaves and flattish blue or purple flowers. The best-known kind is *B. calycina*, of which there are many garden forms, including *eximea*, *macrantha*, and *violacea*. They grow well in a compost of sandy loam and peat, and like a stove temperature and a humid atmosphere. They are easily raised from cuttings, and nice bushy flowering plants can be obtained in 5-in. pots in about twelve months.

Cacti.—For market purposes small specimens are chiefly grown in pots varying from 1½–3 in.; larger specimens, if required, may usually be picked out from among the stock plants. A stock of varieties is easily raised from seed and cuttings. Both may be obtained from F. A. Haage, jun., Erfurt, Germany, or from Franz de Laet, Contich, Belgium.

If seedlings are to be raised, the best time to sow is in February, in a temperature of 65°–70° F. The soil should consist of 3 parts turfy loam, 1 part sand, and ½ part each of peat and leaf mould. Well-crooked 6-in. pots should be filled to within 1 in. of the top, scalded with boiling water, and then the seed sown thinly on top and lightly covered with soil. A sheet of glass may be used to cover the pots, or, better still, a small pit may be made for them in the house. An even temperature must be maintained, and the soil kept uniformly moist. The seeds ought

to germinate in from two to four weeks, and will require pricking off, as soon as sufficiently large for handling, into 6-in. pots, using the same compost as for seeds.

The seedlings will need to be kept under glass as before until established, when they may be moved into a position where they will get more light and air; a temperature of 60° to 65° F. by day and 5 degrees less at night should be maintained. As they grow they require pricking off into boxes, the ordinary seed trays for preference, using 5 parts of soil, 1 sand, and $\frac{1}{2}$ each peat and leaf mould. One or two more prickings off may be necessary, but too much root run is injurious to the young plants. Grow the plants on in boxes until ready for the various-sized pots. For potting, the last compost mentioned, but slightly rougher, will do admirably. Once potted, and the plants well established, they are ready for sale. Careful watering is necessary at all times, especially during the winter months, when very little is required. Cuttings of Cacti and Succulents need to be handled quite differently from any other cuttings. They must not be inserted in soil until absolutely dry and firm at the base. This will take from two weeks for *Opuntias* to four or six weeks for *Cereus* and *Euphorbias*, perhaps slightly longer in winter. They should be potted in the ordinary manner, using the same compost, which should be nearly dry. It must be kept dry until rooting commences, when water may be given very sparingly until the plants are established. A fair number of plants should be grown on to make large ones for seeds and cuttings. Most of these plants should be taken out and repotted in the early spring each year. Those varieties grown from seed should be kept in a cool airy greenhouse—facing south if possible—during the summer. To flower well the plants must be well ripened, and hand fertilization is necessary to ensure seed.

Mealy Bug is the chief pest of Cacti, but this may be kept down by the usual methods. Sun-scald sometimes accompanies a too-sudden change of temperature or atmosphere.

The following are all proved varieties for market work; those marked with an asterisk * are good seed-bearers. The rest give cuttings or offsets; the majority of the seed-bearers will also give offsets.

CEREUS.—*Atropurpureus*, *Baumanni*, *candicans*, *geometrizzans*, *grandiflorus*, *flagelliformis*, *marginatus*, *nycticalus*, *peruvianus* and vars., *paraguayensis*, *speciosissimus*, *Schickendantsi*, *Seidelli*, *Spachianus*. Seeds of most of these varieties can be obtained from Continental growers.

ECHINOCACTUS.—*Grahlianus*,* *mammillosus*,* *Ottonis* and vars.* To obtain offsets of these and other varieties scoop out the centres. *Echinocacti* require a higher temperature than most Cacti, and also plenty of air.

ECHINOPSIS.—*Duvalli*,* *Eyresii*,* *minuscula*,* *multiplex*,* *triumphans*,* *tubiflora*,* *turbinata*,* *Zuccariniana*.*

MAMMILLARIA.—*Arietina*, *bocosana*,* *cirrhiifera* and vars.,* *crassispina*, *elegans*,* *elongata* and vars.,* *gracilis*,* *Krameri*,* *nigra**, *Petersoni*,* *pusilla* and vars.,* *sanguinea*,* *Wildiana*.*

OPUNTIAS.—Arborescens, aurantiaca, Bigelowi, brasiliensis, cylindrica, dejecta, imbricata, leucotricha, maxima, microdasys and vars.; monacantha, polyantha, Rafinesquiana, senilis, sulphurea, Tuna. All Opuntias require plenty of light and air to develop showy spines.

PHYLLOCACTUS.—Any of the named varieties will do, but they do not sell so well as members of the genera mentioned above. A rather high temperature and plenty of water should be given during the growing season, with all the light and air possible, and a dry cool house in the winter. *P. crenatus* (fig. 269) is a fine creamy-white and orange-flowered species from Honduras.

The following Succulents and other plants work in well with the Cacti:—

ALOE.—Distans, albospina, arborescens, latifolia.

CRASSULA.—Adunca, Bolusi, Hookeri, lacteapunctata, lycopodioides, Pachyphytum. Propagate by breaking off the fleshy leaves, and lay on a nearly dry sandy soil till rooting commences, when water sparingly. For lycopodioides take cuttings in the usual way.

EUPHORBIA.—Antiquorum, cereiformis, canariensis, globosa, mammillaris,* and resinifera.

GASTERIAS.—Laete-punctata,* nigricans,* parvifolia,* spiralis,* and verrucosa.*

HAWORTHIA.—Attenuata.*

MESEMBRYANTHEMUM.—Deltoides, echinatum, stellatum, tigrinum.*

ROCHEA.—Falcata.

SEMPERVIVUM (hardy).—Arachnoideum, californicum and c. minor, chrysanthum, ciliosum, Lehlium, montanum, murale, Schmidtii, violaceum.

STAPELIA.—Atrata,* anguinea, gigantea, grandiflora, angustifolia, patula. Stock plants should be kept in a cold frame during the summer.

Cacti or other Succulents for market are usually potted into special ribbed pots, and put up for the market in mixed boxes of various sizes, one plant of each variety being labelled. They are also sold freely, in miniature greenhouses, of various sizes, from 6-30 in. long.



Fig. 269.—*Phyllocactus crenatus*

To these may be added *Dyckia princeps* (or *altissima*), a pretty little Bromeliad having rosettes of sharp-pointed sword-shaped leaves, striped with white and green beneath, and armed with strong brown spines on the edges. [P. A. C.]

Caladium.—A genus of tuberous-rooted Aroids from Tropical America, remarkable for their broadly arrow-shaped leaves of membranous texture, often brightly coloured and veined, and varying in size from a few inches long to a couple of feet. The colours also vary from almost pure white to deep crimson, purple, bronze, pink, &c., the leaves in many instances being conspicuously blotched and marbled with quite distinct colours. The plants are easily grown in a stovehouse, and like abundance of water during growth. A compost of turfy loam, leaf mould, or peat, or old cow manure and silver sand in equal proportions, and well mixed, suits them perfectly. When growth is over, the tubers are rested in a temperature not below 60° or 70° F. The natural species are rarely seen, being eclipsed in beauty by the many lovely hybrids that have been raised, and said to number over 2000. The best-known species is *argyrites*, which is largely grown on account of its comparative hardiness. *C. esculenta* (*Colocasia*), from the Sandwich Islands, is now used for sub-tropical bedding in summer with a closely related plant — *Colocasia*



Fig. 270.—Caladium

antiquorum—both having large oval heart-shaped leaves. Caladiums are raised from suckers, seeds, and by division of the tubers (fig. 270).

Calathea.—A genus of stove plants closely related to the Marantas, and like them having ornamentally variegated leaves. They like a compost of sandy loam and peat, and are increased by division.

Calceolaria.—The Shrubby Calceolarias—said to be descendants of the Chilian *C. rugosa*—are almost hardy in the milder parts of the kingdom, and during the summer months at least they are used in thousands for bedding-out purposes. Being dwarf, sturdy, and compact in habit, and not requiring any stakes, they are well suited for this work, especially as their pouch-like flowers of gorgeous yellow, crimson, or maroon, are produced with great freedom. The plants are raised from cuttings in September and October. Non-flowering well-ripened young shoots from the base of the old plants are preferred as cuttings. They are inserted in very sandy well-drained soil in cold frames. Here they pass the winter, receiving, however, plenty of light and as much air as possible, after being rooted, in genial weather. Sharp frost must be excluded by mats or other

material. In February and March the young plants are carefully lifted and potted up singly into 3-in. or 5-in. pots. The tops are pinched out, and by keeping the plants close and shaded from strong sunshine for a few days they soon recover. They are watered when necessary and sprinkled overhead on genial days. The tops of the shoots may be dibbled into boxes of sandy soil as cuttings, and if kept warm and moist for a few weeks, either in a hotbed or close frame, they soon root, and make sturdy little plants the best of which may be transferred to 3-in. pots if necessary. A good trade, however, is done in box stuff as well as in pots. A compost of loam, leaf soil or well-rotted manure, sand, and a sprinkling of basic slag suits *Calceolarias* very well. They are somewhat subject to Greenfly under glass in spring, but this pest may be kept down by vaporizing, or fumigating, or by syringing the plants with a solution of quassia chips, soft soap, and nicotine. To maintain a gay appearance during the summer months the plants require copious supplies of water, especially when used in window-box decoration. Plants are often killed by a fungoid disease, probably *Botrytis*, and as there is no remedy it is best to have them pulled up and burned. Before planting afresh, the soil might be dressed with flowers of sulphur.

Amongst the most popular varieties of Shrubby *Calceolarias* are *Golden Gem*, *Gaine's Yellow*, *aurea floribunda*, and *Prince of Orange* amongst the yellows; *Bijou*, *General Havelock*, *Firefly*, *Sultan*, *Sparkler*, and *Victoria* amongst the deep crimson, bronzes, or maroons.

A Peruvian species—*C. amplexicaulis*—1½–2 ft. high is often seen in public parks and gardens. It has beautiful soft lemon-yellow flowers. *C. Burbidgei*—a hybrid between *C. Pavoni* and *C. fuchsiaeifolia*, is also an attractive plant, 2–4 ft. high, with soft yellow flowers, and with a loose habit. *C. alba*, with pure-white flowers, is a Chilean species, 3–4 ft. high. All these offer splendid scope to the hybridist.

HERBACEOUS CALCEOLARIAS.—These large-leaved plants are derived from *C. arachnoidea*, *C. corymbosa*, and *C. crenatiflora*—all natives of Chili. The progeny of these plants are remarkable for their large and gorgeously coloured and elegantly blotched flowers of various shades. They are all raised from seeds and require the protection of a greenhouse or frame throughout the year. The seeds are sown in rich, sandy, and well drained soil in May and June in the same way as those of *Begonias* and *Gloxinias*, but in a temperature varying from 60° F. by night to 65° to 70° F. by day. If the seed pots or pans are covered with a sheet of glass, moisture is maintained overhead, and the young plants appear in less than a fortnight. When the second true leaf has developed the seedlings are pricked off about 1 in. apart in a compost of 3 parts leaf soil, 1 part rich loam, and 1 part sand. They are kept shaded and close for a few days till established. In about a month they will be large enough for 2½-in. pots, and as these become full of roots, the plants are again transferred to 5-in. or 6-in. pots. About March—that is nine or ten months from the time of sowing the seed—the final potting takes place. The

compost preferred by specialists on this occasion consists of 3 parts rich loam, 1 part leaf mould, and a good sprinkling of rough powdered charcoal and crushed oyster shell or a little mortar rubble. Failing this a little basic slag will be found excellent.

Throughout the growing period, the main points to attend to are careful watering, sprinkling overhead on all warm genial days, shading from strong sunshine, fumigating if necessary for Greenfly, and keeping a watch for slugs, which are sometimes very troublesome. When the plants are coming into flower, weak liquid manure may be given occasionally, but over-watering must be guarded against (fig. 271).



Fig. 271.—Herbageous Calceolaria

Camellia.—The trade in Camellias is not nearly so extensive as in former years, although one or two nurserymen still make a brave show

of flowering plants during the winter season. At one time growers for market cultivated Camellias in almost any kind of glass structure, and in old establishments one may still see here and there some fine old specimens in tumble-down lean-to houses. Late vineries were a favourite place for housing the pot plants during the winter months, while during the summer months they were placed in the open air in the same way as Azaleas. For the purpose of the cut-flower trade the old Double White Camellia (*alba plena*) is unrivalled, and is largely used by florists. The blooms are cut quite close to the base without a stalk, and are packed in shallow boxes on a layer of cotton wool, and realize from 1s. to 1s. 6d. per dozen flowers. Of late years, however, owing to the more extensive use of the white lancifolium and longiflorum Liliiums, the Double White Camellia has lost its former importance.

The culture of Camellias is quite simple. They flourish in almost any good soil of a loamy nature, or a mixture of loam and peat, and require very little heat, even to force into early blossom. During growth the roots must be supplied with plenty of water, and until the flower buds are well set the foliage must be frequently syringed to keep it clean and glossy and free from attacks of insects and black fungus.

To keep plants in good shape it is necessary to thin out twiggy shoots in the centre after the flowering period, and thus induce new growths outwards and lower down the main stems. It is unnecessary to pot the plants every year, some lasting for several years in the same pots. To

keep them up to the flowering mark, however, weak liquid manure should be applied during active growth. Camellias may be propagated by cuttings of the nearly ripened young shoots inserted in sandy peat and loam, and plunged in bottom heat. They are, however, increased more readily by grafting—the scions of choice varieties being united with stocks of the commoner single-flowered varieties. In this way large numbers of plants are raised on the Continent. Some firms also make a speciality of raising seedling varieties.

Canna (INDIAN SHOT).—The trade in these plants has increased enormously during recent years, and there are many exquisite garden hybrids used for the decoration of the garden during the summer, and also for the conservatory. They are almost as easily grown as Dahlias, and are increased by division of the fleshy rootstocks, and also by seeds sown in heat in spring. The illustration (fig. 272) gives a good idea as to the general appearance of the plants, but some varieties are much taller than others, and also differ in the colour of the leafage, the shades varying from light green to deep crimson purple. The flowers also are re-

markable for the beautiful colours, red, scarlet, orange, &c., being represented, while many are blotched and stained with other colours. Different groups known as “Orchid flowered”, “Gladiolus flowered”, and “large flowered” are known, and fancy names have been given to the best.

Capsicum.—Varieties of *C. annuum* with yellow fruits, and of *C. minimum* with crimson fruits are grown for decorative purposes. The seeds are sown in heat in February or March, and soon germinate. The seedlings



Fig. 272.—*Canna italica*: to show habit

are potted up singly and grown on in genial warmth, and when large enough are transferred to larger pots. Once established they like plenty of light and air, and form bushy plants, 1-1½ ft. high, laden with shining fruits, which last a long time in perfection.

Carnations, Perpetual Flowering.—These love an airy, light position, and will not stand coddling. This is one of the principal points which has to be remembered always to ensure success. Above all things commence with a vigorous healthy stock. Select good cuttings from the base of the flowering stems between December and March. Cut or pull them off at a joint, and insert them firmly in pure sand, either direct in the bed or in small pots or pans. Maintain as nearly as possible a bottom temperature of 60° F., and an overhead temperature of 50° F. Exclude all draughts, and shade from the sun. Sprinkle the tops freely and keep the sand moderately moist for about ten days. After this the cuttings will begin to callus; they should then be kept a trifle drier. When they have begun to root, more air and light must be admitted, to prevent the tops from growing while still in the sand; this would harm them, as such growth is bound to be soft and weak.

As soon as the cuttings are sufficiently rooted, which will be about four weeks after they were inserted, they should be potted into very small pots in a fairly light loam to which one-third of thoroughly decayed leaf soil may be added, and the whole should be finely sifted. After keeping the freshly potted small plants for a few days rather close and shaded from the sun, and moderately moist at the root, full light and air should gradually be admitted.

As soon as the young plants are well rooted through the soil, which will be in about a month from the first potting, they should be repotted into 3½-in. pots. This time a stronger mixture of soil should be given, viz. 4 parts of good loam, 1 part of old hotbed manure or well-decayed cow-dung, and a little wood ashes. This mixture should be chopped as fine as possible but not sifted.

Care must be taken not to pot the Carnations too deeply at any time: the top of the roots should be only just below the surface. A firm potting is also at all times necessary.

After the plants are well established in the 3½-in. pots it will generally be necessary to give them their first "stop", that is, to pinch out the top of the young plant just when it begins to lengthen and show an inclination to run into bud.

When the 3½-in. pots are again well filled with roots, the final shift into 7-in. pots will be necessary about the beginning of June. Plants propagated very early in the season may, of course, require an extra transplanting into 9-in. pots. The final potting should, however, never be done after the end of June if a crop of flowers for early autumn and winter is desired.

The soil for this final potting should be a little richer than the last, and the following will be found to make a very good mixture: 3 parts of good fibrous loam, not too light, 1 part of thoroughly decayed cow-manure, or



AMERICAN CARNATION "REX" AT MR. C. ENGELMANN'S NURSERY, SAFFRON WALDEN



(27)

AMERICAN CARNATION "WINSOR" AT MR. ENGELMANN'S NURSERY
Showing network of string and wire to keep the shoots and flowering stems erect

the remains of an old hotbed. To a barrowload of this may be added about 3 lb. of coarse bone meal, and a similar quantity of wood ashes. At this final potting the soil should be well rammed into the pots with a flat stick.

As regards indoor or outdoor summer culture opinions are divided. During wet seasons, and where light and airy houses are available, indoor cultivation throughout is to be recommended. If the season, however, is favourable it appears to be an advantage to the plants to be placed in the open from about June to the middle of August.

FINAL STOPPING.—The final stopping should be done when the plants are in the flowering pots, not later than the end of June. With quick-growing varieties the middle of July, however, will be late enough to stop the plants if an autumn and early-winter crop of flowers is desired. Varieties that make many shoots at the base of the plants, like *Britannia*, *Mrs. Burnett*, *Mikado*, &c., should be stopped not later than the beginning of June; others, like *Enchantress*, *White Perfection*, &c., can be stopped as late as the middle of July.

STAKING, TYING, OR WIRING.—This should be attended to immediately after the final potting, and every shoot must receive attention, as each one now means a flower during the winter months.

The winter temperature should be kept as near as possible at 50° F. during the night, with a slight rise, say to 55° F., during the daytime. It is, however, advisable to commence firing rather early in the season in order to exclude the damp autumn air from the houses. After January the temperature may be increased by 2 to 4 degrees if the weather is fairly bright and congenial. Ventilation should be given daily if at all possible, even if the fires have to be forced a little more to keep the temperature at the proper point. Watering should be done sparingly during the winter; but in spring, when the plants are growing fast, plenty is required. About April, when the sun gets powerful, a daily syringing before noon will be found beneficial.

DISBUDDING.—This must be attended to as soon as the buds are large enough to handle easily. This means, of course, that all except the crown or terminal bud on each shoot must be removed if long-stemmed flowers are required. Should pot plants be wanted for decorative purposes it is advisable to let all buds develop into flowers. Artificial manure should not be given until about Christmas, when a light dressing of bone meal will be found beneficial. Later in February, and especially from March and April onwards, when the plants grow very rapidly, some of the stronger and quicker-acting manures, such as guano and special carnation mixtures, that are now prepared by most manure merchants and Carnation specialists, should be given at frequent intervals. How much and how often depends upon the condition of the plants—if strong and fast growing a weekly dose would not be too much.

DISEASES AND PESTS.—These are sometimes troublesome, and here, as in other cases, the grower will find that "prevention is better than cure". A light weekly spraying with one of the commercial nicotine solutions will

be found to prevent most of the troubles when the plants are outside; and a slight weekly nicotine fumigation will serve the same purpose inside. If the insects have got a firm hold a stronger dose at frequent intervals will be found necessary, or even an occasional dip of the whole top of the plant in a strong solution may have to be resorted to as a last resource. If even this is of no avail it will be found more profitable to burn the plant than to keep on doctoring it. Of fungoid diseases "rust" is probably the most common but not by any means the most to be feared. If the rust puts in an appearance before the plants are in bloom these should be frequently dusted over with a mixture of half each of sulphur and air-slaked lime, and all diseased leaves should as far as possible be removed and burnt. When the plants are in bloom it is not advisable to dust them over, as the lime and sulphur mixture may burn the flowers. It is then better to spray the plants with Bordeaux mixture or a solution of 1 oz. of liver of sulphur in 1 gal. of water. Care should be taken not to touch blooms and buds that show colour with these mixtures. The chief point, however, when rust appears, is to keep the atmosphere of the house dry by keeping the pipes warm, especially at night, for the spores of the rust can only germinate in drops of moisture. The "spot" is another rather common and troublesome fungoid disease. It requires practically the same treatment as the rust. Another trouble is the so-called stem rot. This is a fatal disease, attacking the base of the plants, and killing them. Some of the older varieties are principally affected by it, and as it is really a constitutional complaint, that appears in the old age of a variety, it does not seem advisable to attempt many cures, especially as none has much effect on the malady. It is best to discard and burn those varieties that suffer most, and grow others in their places that have a healthy constitution.

The growing of the Perpetual Flowering Carnation is one of the many things that cannot entirely be learned from books, but the lover of this beautiful flower who keeps an ever-watchful eye over his plants will not be long without success.

As regards varieties, it is difficult to name the best, there are now so many really good ones. Some of these give almost universal satisfaction; others appear to flourish in one district while they fail entirely in another. It is in all cases best for the grower of the Perpetual Flowering Carnation to select a collection of his favourite colours and grow them as best he can. Some, no doubt, will bring good results, and should be kept; those that fail entirely should be discarded, and some of the novelties be acquired to replace them. In this way everyone will in a few seasons get a collection most suited to the local conditions. The following will be found a good selection for growing on a large scale:—

White.—White Perfection, White Enchantress, White Wonder.

Light Pink.—Enchantress, Pink Delight, May Day.

Rose Pink.—Winsor, Gloriosa, R. F. Felton, Dorothy Gordon, Mrs.

C. W. W. Ward.

Deep Pink.—Edith Waters, Washington.

Salmon and other shades of Pink.—Lady Allington, Lady Northcliffe, Rose Doré.

Red.—Britannia, Beacon, Scarlet Glow.

Crimson.—Triumph, Carola.

Yellow and Yellow Ground.—Fortuna, Golden Glory, J. Whitcomb Riley, Sunstar, Canary Bird. (For Border Carnations see p. 17.)

MALMAISON CARNATIONS have been eclipsed to a great extent by the perpetual flowering varieties, but are still grown largely and are offered in the trade in large numbers. They are cultivated in the same way as the perpetuals under glass, but flower chiefly in May and June. After this time they are usually propagated from layers which are potted up as soon as the roots are well formed, and are placed as near the glass as possible. The old "Blush" variety has given rise to many sports, including the "Pink" and "Princess of Wales". [C. E.]

Carnivorous Plants.—A somewhat restricted trade is done by a few specialists in these plants, which are usually grown in cool houses, and in a compost of peat and sphagnum moss. The best-known kinds are *Darlingtonia californica*, with curious hood-like leaves, mottled green and white; *Dionæa muscipula*, the well-known "Venus' Fly-trap", the curious toothed leaves of which resemble a rat trap in appearance and action. *Cephalotus follicularis*, the Australian flycatcher, and various species of *Sarracenia*, such as *Drummondii*, *flava*, *laciniata*, *purpurea*, *rubra*, *variolaris*, &c., all remarkable for their coloured and netted tubular leaves with lids.

To these must be added the Tropical Pitcher Plants (*Nepenthes*), which require to be grown in a hot and moist atmosphere, and in a compost of peat and sphagnum, to secure finely coloured "pitchers" (see Vol. I, pp. 49, 50, fig. 41).

Carpet-bedding Plants.—Notwithstanding the onslaughts made on carpet bedding, a large trade is still done in plants used for this particular style of gardening, and so long as a demand exists, growers will always respond. The following plants are raised chiefly for carpet-bedding purposes, those marked with an asterisk being hardy:—

**Achillea umbellata*.
Acrocline Saundersoni.
Agathæa cælestis variegata.
Agave americana variegata.
**Ajuga reptans purpurea*.
Alternanthera.
Alyssum maritimum.
**Antennaria tomentosa*.
**Cerastium tomentosum*.
Coleus Verschaffelti.
Cotyledon (Echeveria).
**Dactylis glomerata variegata*.
**Herniaria glabra*.
Kleinia repens.
Leucophyton Browni.

**Lysimachia Nummularia aurea*.
**Mentha Pulegium gibraltaricum*.
Mesembryanthemum cordifolium variegatum.
Nertera depressa.
Pyrethrum aureum.
Roehea (Crassula) falcata.
**Santolina incana*.
**Saxifraga*, mossy vars.
**Sedum*.
**Sempervivum*.
**Spergula (Sagina) pilifera*.
**Stellaria graminea aurea*.
**Teucrium polium*.
**Veronica candida*.

Celosia cristata (COCKSCOMB).—This East Indian annual is still popular in many places, and is grown either for greenhouse decoration or for planting out during the summer months. Seeds are sown in heat in February or March, the young plants being pricked out of the seed pots or pans in due course, grown on, and hardened off if necessary. To secure fine "combs" early the soil should not be too rich, but a certain percentage of ill-formed combs must always be expected. The plume-like inflorescences of the typical plant have now been replaced with thickened masses of velvety tissue, curled and crimped into peculiar shapes.

The Plumed Cockscomb—*C. plumosa*—with feathery plumes of various colours, may be grown in the same way, but requires good rich soil and proper attention to watering, &c., to secure the best results.

Cestrum (Habrothamnus).—A genus with a few species of climbing greenhouse shrubs, easily grown in sandy loam, and raised from cuttings. The best kinds are *aurantiacum*, with golden-yellow tubular flowers; *elegans*, with red flowers; *fasciculatum*, crimson, and *Newelli*, scarlet.

Chrysanthemums.—These are now grown in such enormous quantities for the various markets, that to be successful it is necessary for the grower to keep his selection strictly up to date, and to neglect no detail in his system of culture. To obtain good prices, or to ensure selling at a reasonable rate when markets are glutted, the quality whether of blooms or spray must be good, and the grading and packing above reproach.

The first and one of the most important considerations in good cultivation is naturally the soil. Good rich turfy loam is the best, and no trouble should be spared to obtain it. Most nurseries have a meadow of some description to draw on for their potting supplies. It is worth while considering whether the turf from that source is as good as it might be. Practice has proved that the cheapest method of feeding Chrysanthemums is to mix the necessary ingredients with the soil; it is still cheaper and more convenient to apply such manure to the turf a year or two before the soil is wanted. If a plot of ground for a year's supply of Chrysanthemum soil is marked out, samples should be drawn from different spots thoroughly mixed, and a portion sent for analysis to a competent horticultural chemist, who will usually indicate the methods by which the soil may be improved. As an example of what may be done, the following hints may be of use. If nitrogen is deficient, a light sowing of clover will improve matters, the nitrogen-fixing bacteria will enrich the soil from the atmosphere with practically no expense to the grower. As nitrogen is the dearest food we have to buy, this becomes a considerable item. Lime in many cases (especially on alluvial soils) is present in negligible quantities; it is better to apply it in three or four dressings to a growing turf than to have to apply it in quantities at time of using. Phosphates are applied easily and economically on most soils by the use of basic slag, which also supplies lime; as slag is only slowly available, the advantage of applying in advance of requirements is evident. Potash is usually in the soil in

sufficient quantities, although not always available, but the increased quantities of lime will bring it into use. This may appear to be a prolonged method of obtaining good soil, but it is undoubtedly the best. A much smaller amount of feeding is required when the pots are full of roots, the labour of applying the manure is saved, and the plants make a steadier and sturdier growth. As a piece of ground is stripped, if depth permits it should be dug over, a dressing of chemicals given, and sown down with a suitable mixture of grasses containing a fair proportion of clovers. A good turf should be formed in four or five years.

It takes two or three years usually to raise the food values of the soil to the required quantity; and if so much care and time cannot be given, an analysis of the soil should at least be obtained, and, acting on the analyst's advice, the necessary materials added in the spring. If rotted or mushroom manure is to be used, this should be mixed in before samples are drawn.

For a soil of medium texture the following method may be commended to those who do not wish to trouble about an analysis. To 5 parts of soil add 1 part of spent mushroom manure, or if rotted manure is used, 1 part to 6. To every two barrowloads of soil add one 32-pot of bone meal and one 32-pot of slaked lime; to every four barrowloads add one 32-pot of ground hoof and horn. Turn several times to ensure thorough mixing, and, if possible, leave a month or two before using.

For light soil rotted manure is better than mushroom manure, and should be used more freely—1 part to 4 or 5. The soil should be the first care of the grower, and after that the stock. It may be added that one advantage of putting the manures into the soil before starting to pot is that less feeding is required, consequently the cuttings come more freely and are better; if it can possibly be helped, they should not be taken from plants that have been highly fed. The best cuttings come from plants that are planted out on poor soil on which practically no care or attention has been expended, with the exception of keeping the weeds down. As far as possible only sucker cuttings should be taken; other cuttings run to bud.

Stools from which cuttings are desired, if not from the open ground, should be knocked out of the pots, and the ball of soil reduced. They should then be packed together as closely as possible on the surface of the ground in a cool house, and lightly covered with soil; at the same time a drenching with clubicide or similar preparation—1 to 1000 parts of water—being given to kill all slugs and other insects. A temperature of 45° F. with plenty of light and air will favour good firm cuttings. After the latter are taken from the plants, before they are trimmed, they should be dipped in a wash of XL All, one 60 pot to 2 gal. of water, if there is any suspicion of Greenfly. A good cutting should be moderately thin, firm, and slightly purple on the stem; 2-2½ in. is a good length. A clean cut should be made with a sharp knife immediately below a joint, and the leaves trimmed off for two or three joints, or about 1 in. As soon as the cuttings are trimmed

they should be dipped in a solution of potassium sulphide—1 oz. to 2 gal. of water—as a preventive of rust and mildew. The soil for them should consist of 3 parts light soil to 1 part of mushroom manure; this should be put into herring boxes and rammed firmly, keeping the soil $1\frac{1}{2}$ in. from the top. Fifty-five cuttings usually go to a box. A hole $1\frac{1}{2}$ in. deep is made with a dibber for each one, the cuttings being inserted, and the soil pressed firmly round the sides and base; it is very necessary that the base should touch the soil, or rooting will not take place, and the cuttings will wither. The boxes may then be labelled with the number or name and the cuttings watered in, a good soaking being given.

The best place for them is a pit in the house, made by putting two 6-in. boards on edge and laying lights over. Failing this, sheets of paper or glass should be spread over the boxes to prevent the cuttings from flagging. A little flagging is beneficial to encourage rooting; slight dampings with a syringe once or twice a day will keep this from going too far. An occasional watering, however, will be necessary to keep the soil moist. All decaying foliage should be picked off at once. When the actual rooting has commenced, more air should be allowed, and the boxes given greater space. When the cuttings are firmly established, all the air possible should be given them, the temperature being kept at 45° to 50° F., and everything done to ensure a firm and stocky growth.

From the boxes the usual market practice is to pot the cuttings direct into 48's (5 in.), putting two or three plants into each pot, according to the variety. For incurved varieties it is better to pot singly into 60's (3 in.), being careful to keep the young plants well up, as thoroughly ripened wood is most essential. A mixture of 3 parts of loam to 1 part of mushroom manure, to which the addition of a 48 (5 in.) potful, both of lime and bone meal, to each barrowload will give good results. They should be potted firmly, the pots being filled to within $\frac{3}{4}$ in. of the top, using only a flat stopper to cover the hole in the pot. After potting they should not be watered till absolutely necessary, but soaked thoroughly when they are. As soon as the roots reach the sides of the pots the plants should be put into a cold pit if the weather is favourable, of course making ample provision for covering in the event of a frost. From the middle to the end of March is the usual time for shifting to the pits, and once there they do not require a great deal of attention. Careful watering, full air on sunny days, indeed plenty of air at all times except when frosty; care in giving the growing plants needful space; an occasional scraping of the surface of the soil, and removal of weeds; these are some of the chief things a grower should attend to if he desires to produce good and creditable plants.

The final potting cannot commence till the third week in May; but everything ought to be prepared in readiness, all the required pots should be cleaned and crocked, soil got ready, and potting benches set up. With new and choice varieties a shift from a 48 (5 in.) pot to a 32 (6 in.) is often worth while, to keep the plants moving. A careful eye should be

kept for any signs of starvation, and a weak stimulant given at intervals to keep the plants up to the mark. It does not pay to pot rubbish. Soot and stable liquor are both excellent if well diluted for this feeding.

FINAL POTTING.—For the final potting, 16's (9 in.) and 12's (10 in.) pots are used, about 1 in. of crocks being laid over the holes. First place soil in the bottom, ramming it firmly, then put the plant on top, placing it at such a depth that the top will be covered $\frac{1}{2}$ in., and the surface of the soil $1\frac{1}{2}$ in. from the top of the pot. Then it should be filled up gradually, an even degree of pressure being maintained. Firm potting is most essential, and it must be even throughout. It is as well to have some straw or canvas handy in case of frosts, which are not unknown in June. No water should be given till the plants show signs of flagging, when a good soaking will be best for them. If the plants are potted properly, when the pots are filled to the brim the water should take two or three minutes to soak away.

SUMMER QUARTERS.—The plants must now be set out in their summer quarters as soon as possible, the "incurveds" and the finer-rooted varieties being given the warmest and driest positions. Well-sharpened hazel sticks, 5-6 ft. long, are best for staking; they should be inserted, after watering, in a south-west position, as most winds blow from that quarter. Tying should follow quickly on the staking, the raffia being passed once round the stick to prevent slipping. Afterwards all is routine work—watering, tying, spraying, stopping, disbudding, and feeding. The latter should not be necessary in most seasons till at least the middle of August, with the compost recommended; but in the hot dry seasons it may be necessary to start earlier. The colour of the foliage will reveal the plant's condition; if it alters to a yellowish-green, and the foliage becomes smaller, feeding is undoubtedly necessary. Little but often, and in as varied a form as possible, is productive of the best results. Guano, liquid manure, cow manure for hot dry soil, soot, any good chemical manure as advertised for Chrysanthemums (always mixing the latter with three or four times its bulk of soil), will provide a good range of "feed" or diet. The foliage should be kept solid and firm, and of a good colour at all times. Occasionally, in cold wet summers, some varieties, from no apparent cause, will go almost yellow; as a rule, a dose of sulphate of iron—1 oz. to 1 gal. of water—will cure this. When stopping, care should be taken to take out merely the tip of the plant; some varieties are very sensitive to hard stopping, and in any case the breaks are stronger from a small stop. Weakly growths should always be removed; they are useless, and any labour spent on them is money thrown away. If earwigs are prevalent, pots filled with hay should be placed on top of the sticks and examined every day.

HOUSING.—This is usually started the second or third week in September. If possible, all houses should have sulphur burnt in them before the Chrysanthemums go in, and should be thoroughly dry. Overcrowding

should be avoided, as weak-necked blooms are the result of this short-sighted policy. All the air possible is now required, but no heat should be turned on before the blooms begin to open, and not even then unless damping becomes apparent. Attempts should be made always to get the house dry in the daytime, watering as early as possible; if the air is heavy, a little heat turned on early in the day is advisable to get the air on the move.

The ventilators should be open on mild nights; on damp ones the houses should be closed to keep the dry air in, unless of course the outside temperature is too high to permit it. Feeding, as advised before, should be done as required, discontinuing it when the flowers begin to open. If any variety begins to grow soft, two doses of superphosphate, $\frac{1}{4}$ oz. to a 10-in. pot, at three-week intervals will stiffen it up. It is possible to make a soft stem as brittle as an icicle by this means; bone superphosphate should be used in preference to mineral, and should be mixed with 3 parts of soil.

As before stated, every endeavour should be made to keep the selection of varieties up to date, a keen lookout being kept for good novelties, and all inferior sorts being promptly discarded. The growth of each variety needs studying, and a universal treatment avoided. The finer-rooted varieties require smaller pots, and must never be overpotted. It will be found that the smaller-leaved sorts do best when only allowed to carry one stem to a plant from the first stop, while the heavier varieties may carry two or even three with advantage. The October and November varieties usually require two stops, and the December ones one stop and a natural break. It is wise to try all new varieties with stops at different dates to find the right treatment for the locality. Singles are grown in the same way as the doubles, and the disbudded large-bloomed varieties require quite as much care. The sprays require three stops, the last from July 1 to 15, and the disbudded ones two. Only stiff-petalled varieties should be grown with at least two rows of florets. Outdoor sorts usually require to be struck rather later, and after being hardened off in a cold pit can be bedded out in another one in good soil, planting at a distance of 6 in. by 4 in. After danger of frost is over, they require lifting with a fork and carefully planting in permanent quarters; well-hardened plants will stand 3 or 4 degrees of frost. All ground for outdoor varieties should be deeply dug, well manured, and dressed with lime during the winter, and, if at all poor a week before planting, dressed with 1 cwt. of sulphate of ammonia to the acre.

A natural break suits most outdoor varieties; or find out when the first natural break of each sort occurs, and stop the next at that date, or even a trifle earlier.

Eighteen inches each way is the best distance for planting, four rows going to each bed, and 2-ft.-6-in. paths being allowed between them.

A careful record should be kept of each variety, and a suggested form is given below.

No.	Variety.	When Struck.	1st Stop.	2nd Stop.	1st Pot.	Final Pot.	Buds Taken.	Flowered.	Remarks.

Spraying should be done consistently for insects, rust, and mildew. The following recipes have been well tried:—

For Insects.—One 60 pot XL All to 2 gal. of water.

For Rust.—Boil 8 lb. soft soap and 4 lb. Lifebuoy or other hard soap, and stir in as much paraffin as it will take—usually about 1½ pt. Use about 1 oz. to the gallon.

For Mildew.—Use the last recipe or the following: Boil for 1 hr., in 5 gal. water, 1 lb. each of soft soap, soot, sulphur, and lime. Allow the mixture to settle and strain off. Use one 60 pot of clear liquid to 2 gal. water.

The following is a list of varieties for pots, with their average dates of flowering:—

White

Moneymaker	Oct. 1.
*Miss Collier	" 10.
*Mrs. Roots	" 10.
Felton's Favourite	" 15.
H. W. Thorpe	" 15.
*Miss E. Fulton	" 30.
*Mrs. Buckbee	Nov. 7.
Miss M. Jeffries	" 25.
*Mrs. Judson	Dec. 1.
Mrs. Thompson	" 10.
T. Pankoucke	" 14.
Mrs. D. Symes	" 18.
*Heston White	" 18.

Pink

Renée	Oct. 12.
*Mrs. F. MacNeice	Nov. 3.
*Mary Thorpe	" 15.
Phœbe	" 20.
Rose Poitevine	" 20.
*Dr. Engulhard	" 22.
Mrs. Rolfe	" 25.
*A. J. Balfour	" 25.
Wells' late Pink	Dec. 1.

Mdlle Louise Charvet	Dec. 10.
Thorpe's Christmas Rose	" 15.
*Winter Cheer	" 15.
*Framfield Pink	" 15.

Bronze

Mrs. P. A. Cragg	Oct. 15.
*Hortus Tulousanus	Nov. 2.
*Bronze F. MacNeice	" 3.
Heston Bronze	" 15.
Lady Lennard	" 15.
Hetty Wells	" 20.
Freda Bedford	" 28.
Lord Brook	Dec. 5.
Bronze Princess Victoria	" 20.
Russet	" 20.

Red

Market Red	Oct. 12.
Crimson King	" 12.
Mrs. J. Humphries	Nov. 4.
H. Silsbury	" 14.
Exmouth Crimson	" 15.
M. Hodgson	" 24.
*Baldock's Crimson	Dec. 1.

<i>Yellow</i>			
Tom Edwards	Oct. 8.	*Nogoya	Nov. 21.
Cranford Yellow	" 15.	Embleme Poitevine	" 21.
*Miss Mary Godfrey	" 22.	*December Gold	" 21.
*Romance	" 31.	Yellow Lady Lennard	" 21.
David Ingamells	Nov. 2.	Yellow Mrs. Thompson	Dec. 4.
Le Peyrou	" 10.	*Francois Pilon	" 5.
		Golden Princess Victoria	" 10.
		W. H. Riemann	" 20.

Note.—Those marked * will lift from the open ground, and if grown for that purpose should be struck from cuttings in March and receive one stop only.

The following are spray varieties for flowering outdoors:—

White—Roi des Blancs, Holmes White, Mrs. Bailey; *Yellow*—Leslie and Carrie; *Pink*—Normandie, Betty Spark, Provence, La Somme; *Bronze*—Tonkin, October Gold, Tuckswood Bronze, Polly, Nina Blick; and all the Massé Family.

For Disbudding.—Sunshine and Mercedes (yellow); White Countess, J. B. Scott (white); Mrs. Beech, N. Blake, Le Pactole (bronze); Madame A. Nonin, Cranford Pink, Lenz (pink). [P. A. C.]

Cineraria.—Not so very many years ago the only Cinerarias in general cultivation were the members of the florist's section, that is to say, those of short sturdy growth and massive heads of large flowers. Now there are many other types, particularly the "stellata" or "cruenta" class, with smaller flowers, and a looser habit of growth. This group is very popular in many private establishments, but from a commercial standpoint the others are preferable, as they meet with a more ready sale. In the case of plants that often pass from hand to hand before they are finally disposed of, freedom from injury under such conditions is an important consideration, and the shorter and stouter habit of the florist's varieties enables them to better resist continual changes than the taller and weaker-habited stellata varieties. Still, a certain number of these last may sometimes be grown to advantage.

Cinerarias may be readily raised from seed. This is usually sown in May and June, though for blooming before Christmas it may be sown in April. The seed is sown thinly in pots, pans, or boxes, using a compost of equal parts of loam and leaf mould, with a good sprinkling of silver sand. The seeds, being very minute, should be carefully attended to in the matter of watering, shading, &c. When the young plants are large enough to handle they are pricked off into pans or boxes, and when the second leaf appears the plants are potted singly into 2½-in. (thumb) pots. A cold frame is then the best place for them, as they dislike draughts but need plenty of air. They must be shaded from the sun. Frequent sprinkling overhead is of great service during bright weather, and overcrowding is particularly harmful. For the final potting, equal parts of loam and leaf mould, with a sprinkling of bone meal and silver sand, form a very suitable compost. A light airy structure is the best place for the

plants during the winter. As the pots get full of roots, give an occasional stimulant.

Aphides or Greenfly are sometimes very troublesome, and so are Thrips if the atmosphere is too dry. These can be kept under by vaporizing with nicotine. For mildew, dust with sulphur, and allow as free a circulation of air as possible. Slugs also must be looked after. A leaf-mining maggot is sometimes very troublesome, but may be checked by early fumigation. [w.t.]

Cissus.—A genus of free-growing stove climbers (now included in the genus *Vitis*), remarkable for their handsome foliage. *C. discolor* has velvety-purple leaves marbled with white and shaded with pink, and is perhaps the best known. *C. argentea* has silvery-grey markings on the leaves; and *C. porphyrophyllus* has purple-tinted foliage. The plants flourish in a rich loamy soil with a little sand and leaf mould, and are chiefly valuable for covering walls or trellises in a warm moist house. They are propagated by cuttings.

Clerodendron.—A genus of shrubby or twining plants of free growth and ornamental appearance when in blossom. They like a loamy soil and stove treatment, and may be raised from cuttings. The best kinds are: *C. fallax*, a bushy plant with large spreading leaves and large trusses of bright-scarlet flowers. *C. fragrans* has white flowers tinted with red. *C. Thomsonæ* (or *Balfouri*), with twining stems, is a fine species with a profusion of deep-red flowers and pure-white calyces. *C. splendens* has rich-crimson flowers, and *C. speciosum* is a hybrid between it and *C. Thomsonæ*.

Clivia.—A genus of South African Amaryllids, still well known as IMANTOPHYLLUMS. They have strong deep-green strap-shaped leaves, and throw up large heads of showy bell-shaped or tubular flowers somewhat like those of the Vallota or Scarborough Lily. They are easily grown in a compost of rich fibrous loam, leaf mould or well-rotted manure, and sand, in about equal proportions, and require warm greenhouse treatment, or, say, a minimum winter temperature of 50° to 60° F. Propagation by dividing the tufts usually takes place in February or March, but stock may be more readily raised from seeds. These should be sown when thoroughly ripe in a temperature of about 70° F., the seedlings being in due course pricked out and grown on in small pots. It takes about three years to attain the flowering stage. The best-known kinds are: *C. cyrtanthiflora*, beautiful salmon red; *C. Gardeni*, orange and red; *C. miniata*, scarlet with a yellow throat; there are, however, many varieties of this species, including a pale creamy-yellow one called *citrina*. *C. nobilis*, bright red and yellow.

Coleus.—There are now innumerable garden forms of Coleus, all being derived from *C. Blumei* (fig. 273), a native of Java. Fancy names have been given to many of them, but as new varieties are so easily raised from seed it is practically impossible to keep pace with the variations which occur. The foliage constitutes the most ornamental feature of the

plants, being so varied in colour. There are varieties having almost pure-yellow and golden leaves, others being veined with deep green, brown, crimson, &c., while many forms have shades of colour varying from pink to the deepest of reds and crimson, intermediate shades of every description being represented and more or less conspicuously veined with other distinct colours. Besides the garden forms, *C. thyrsoides* from Central Africa is known in private gardens. It has long spikes of deep-blue flowers.



Fig. 273.—*Coleus Blumei*

The garden varieties of *Coleus* are of easy propagation and culture, and, although sold cheaply, give good returns, owing to the short time they are in hand. The stock plants should be kept fairly dry during the winter, and in a temperature that falls little, if at all, below 50° F. By the end of February, with increased heat and moisture, new shoots push freely. When large enough they can be taken as cuttings and dibbled into shallow boxes of sandy soil. In a gentle heat these will soon root, when they may be potted singly. Any fairly light soil will suit. The stronger plants may be shifted into 5-in. pots (48's) to form little specimens, for which there is a demand for various decorative purposes, while the later-struck and weaker plants can be disposed of for bedding

out. If there is a demand for these last, the later crop of cuttings can be put into shallow boxes, in which they may be sold without disturbance. When this is done, about two dozen should be put in each box, allowing one or two over in case of accident. The varieties for which there is most demand are those of clear decided colours and good constitution, the old *Verschaffeltii* being still one of the most paying kinds. [w.t.]

Cordylina.—Among plants grown for the beauty of their foliage the Cordylines are very popular, and large numbers are disposed of for decorative purposes. Although nearly all of them are by botanists placed in the genus *Cordylina*, they are usually called *Dracænas*. The hardiest is the New Zealand *C. australis* (often erroneously called *Dracæna indivisa*, a quite different plant). Seed of *C. australis* is at times readily obtained, even from plants grown out-of-doors in particularly favoured parts of

the country. It should be sown at once, and in a temperature of 60° to 75° F., and the young plants will soon appear. The growth is far more rapid if they are grown for some time in a warm structure. Clean, well-furnished plants in 5-in. pots meet with a ready sale at 10s. to 12s. per dozen for table decoration and other purposes, while larger ones are used for summer bedding or for furnishing large halls or corridors that are too draughty for more tender plants. A variegated-leaved form of this, known as *Doucettii*, is very choice. Other green-leaved kinds nearly related to the preceding are *Bruanti*, *congesta*, and *Eckhautei*.

Coronilla glauca.—A pretty leguminous little shrub with blue-green leaves and sweet-scented yellow flowers like a *Cytisus*. It was much grown at one time for greenhouse decoration, flourishing in loam and peat. Raised from cuttings in a close frame.

Cotyledon or Echeveria.—For many years *C. secunda* and its variety *glauca* have been popular market plants, and are used extensively in connection with carpet bedding and for finishing up the edges of raised flower beds. Plants are usually sold in shallow boxes containing one, two, or three dozen, according to the size of the rosettes of fleshy leaves. During the summer months the tubular red and yellow flowers are borne on curved crozier-like stalks. Another useful species is *C. metallica*, which is a much larger and looser plant with fleshy spoon-shaped leaves of purplish metallic hue. In addition to these, other species used for summer work are *agavoides*, *gibbiflora*, *ovata*, *Pachyphyta*, *bracteosa*, *pulverulenta*, *atropurpurea* (or *sanguinea*), *farinosa*, *Peacocki*, &c. All these flourish in ordinary good garden soil in the open air from June till September or October, but must be protected in a greenhouse or frame during the winter. They are propagated by inserting the bases of the fleshy leaves and by detaching sprouts or suckers from the base of the main plant in sandy soil. If the tops are cut off and placed on soil they root and sucker freely in many cases, and sprouts spring out all round the decapitated stem if kept growing.

Crinum.—A large genus of bulbous plants from tropical and sub-tropical parts of the world, having large strap-like leaves and bell-shaped flowers borne in umbels on top of stout fleshy scapes. The tropical species like stove treatment, but some kinds are almost hardy, such as *C. Moorei*, *C. Powellii*, *C. Johnstoni* and *C. longifolium*. The trade is small, and is confined to nurserymen. The plants flourish in well-drained loamy soil, and are increased by seeds and offsets.

Croton (Codiaeum).—All the garden Crotons are descended from *C. variegatum* (also called *C. pictum*), a native of the Molucca Islands, but now more or less naturalized all over the eastern tropics. The original species is an evergreen shrub, having leaves 2 to 10 in. long, varying from oblong to very narrow, often wavy and variegated with green, yellow, red, crimson, &c. Owing to the ease with which the small flowers can be cross-fertilized, numerous garden hybrids have been raised, and constitute a very valuable group of commercial decorative-leaved plants.

Fig. 274.—*Codiaeum* (broad-leaved)

while plants realize anything from 1s. 6d. to 3s. 6d. each in 5-in. pots.

Crotons flourish in good fibrous loamy soil, with a dash of leaf mould or well-rotted manure, to which a little basic slag may be added. The plants should have a minimum winter temperature of 65° to 70° F. During the spring, summer, and autumn months the atmosphere should be kept humid yet buoyant, and during rapid growth copious supplies of water are given, and also numerous syringings. The main point is to keep the plants growing rapidly, and if fairly well exposed to the sunshine they will develop fine colour and be harder in texture.

Fig. 275.—*Codiaeum* (narrow-leaved)

Crotons require plenty of heat and moisture and a fair amount of sunshine to develop the rich colours of the foliage. Plants may be grown in all sizes of pots from 3 in. up to 10 in. and 12 in., but the most popular size for market is that grown in 5-in. pots (48's). The leaves are highly valued in the florist trade, being largely used for backing up the flowers in wreaths, crosses, &c., and for intermingling with effect in bouquets of various descriptions. The broad-leaved varieties (fig. 274) are appreciated for some kinds of work, while the narrow-leaved sorts (fig. 275) are favoured for other purposes; and the trade is not a fleeting one, but lasts the whole year round. The prices obtained for foliage vary from 9d. to 1s. 6d. per bunch;

To secure nice shapely plants on single stems, cuttings of fairly well-ripened shoots will root freely in late summer or early autumn in a gritty com-

post or in leaf mould, coconut fibre, &c., and with a bottom heat of about 80° F. Large pieces with several shoots will also root freely, and in this way quite large plants are obtainable in a comparatively short time. When well rooted they are potted up and grown on.

Mealy Bug, Scale, and Red Spider are the worst enemies of the Croton, but they can be kept in check by frequent syringings with warm or at least tepid water, to which may be added some well-known quassia and nicotine insecticide. Fumigating and vaporizing are also useful in keeping these pests down, as well as Thrips, which are sometimes troublesome.

The following are amongst the best kinds of Crotons grown:—

Broad-leaved.—Andreanum, Williamsi, Thompsoni, Reidi, &c.

Narrow-leaved, drooping, &c.—Angustifolium, Aigburthense, Johannis, picturatum, Warreni, aneitense, Weismanni, Mrs. Dorman, ruberrimum, majesticum.

Lobed leaves.—Disraeli, Earl of Derby, Evansianum, illustris, F. K. Sander.

Twisted leaves.—Chelsoni, caudatum tortile, spirale, Prince of Wales, &c.

Various.—Queen Victoria, Sunset, undulatum, Sunrise, Flambeau, recurvifolium, volutum, Van CErstedi, Flamingo, Hawkeri, &c.

Cuphea ignea (platycentra). (CIGAR PLANT.)—A bushy little Mexican plant with reddish stems, lance-shaped leaves, and scarlet cylindrical flowers resembling miniature cigars with ashy tips. It is much used for bedding out in summer and is raised from cuttings or seeds.

Cureuligo recurvata.—An ornamental Palm-like plant from the East Indies, with broad green plaited arching leaves. There are two varieties, namely *striata*, having a white band down the centre, and *variegata*, which has fine leaves, 3-4 ft. long including the stalks, the blade being irregularly banded with white. They are not extensively grown, chiefly because they can only be increased by division, but the plants sell readily enough. They flourish in a gritty loamy soil with a little well-rotted manure, leaf mould, or peat, and require abundance of moisture at the root and overhead when growing freely.

Cyanophyllum magnificum.—A fine stove plant with large ovate deeply ribbed leaves of velvety texture, rich olive green above, purple red beneath. It likes peat and loam, and is increased by cuttings.

Cycads.—Outside botanic gardens and a few private collections Cycadaceous plants are rarely seen in British gardens. On the Continent, however, specimens are more commonly met with. As market plants they are practically non-existent. A good trade, however, is done amongst florists in the leaves of some kinds, notably in those of *Cycas revoluta*, *C. circinalis*, and *C. pectinata*. The leaves of the latter drop naturally every year, while they remain evergreen for several years on the two first-named. For florists' work the leaves are chiefly used for wreath work and other funeral emblems, either in their natural green colour or in a silvered state. The leaves or fronds are gracefully arching and are deeply divided in a pinnate manner into numerous closely arranged long and narrow leaflets—the entire leaf resembling a huge vegetable feather,

or comb, with teeth on both sides of the midrib. They lend themselves readily to the designs mentioned. The illustration (fig. 276) gives a good idea of *C. circinalis*, the "Sago Palm" of Ceylon, where the thick



Fig. 276.—*Cycas circinalis*

upright stem attains a height of 20 ft., surmounted by a rosette of leaves. Sago is obtained from the pith in the fleshy stems. *C. revoluta*, from China, is the hardiest species known. *C. siamensis* is an elegant species from Siam and Cochin China, having plume-like fronds 4 ft. in length. Growers interested in Cycads will find a fine collection in the Palm House at Kew.

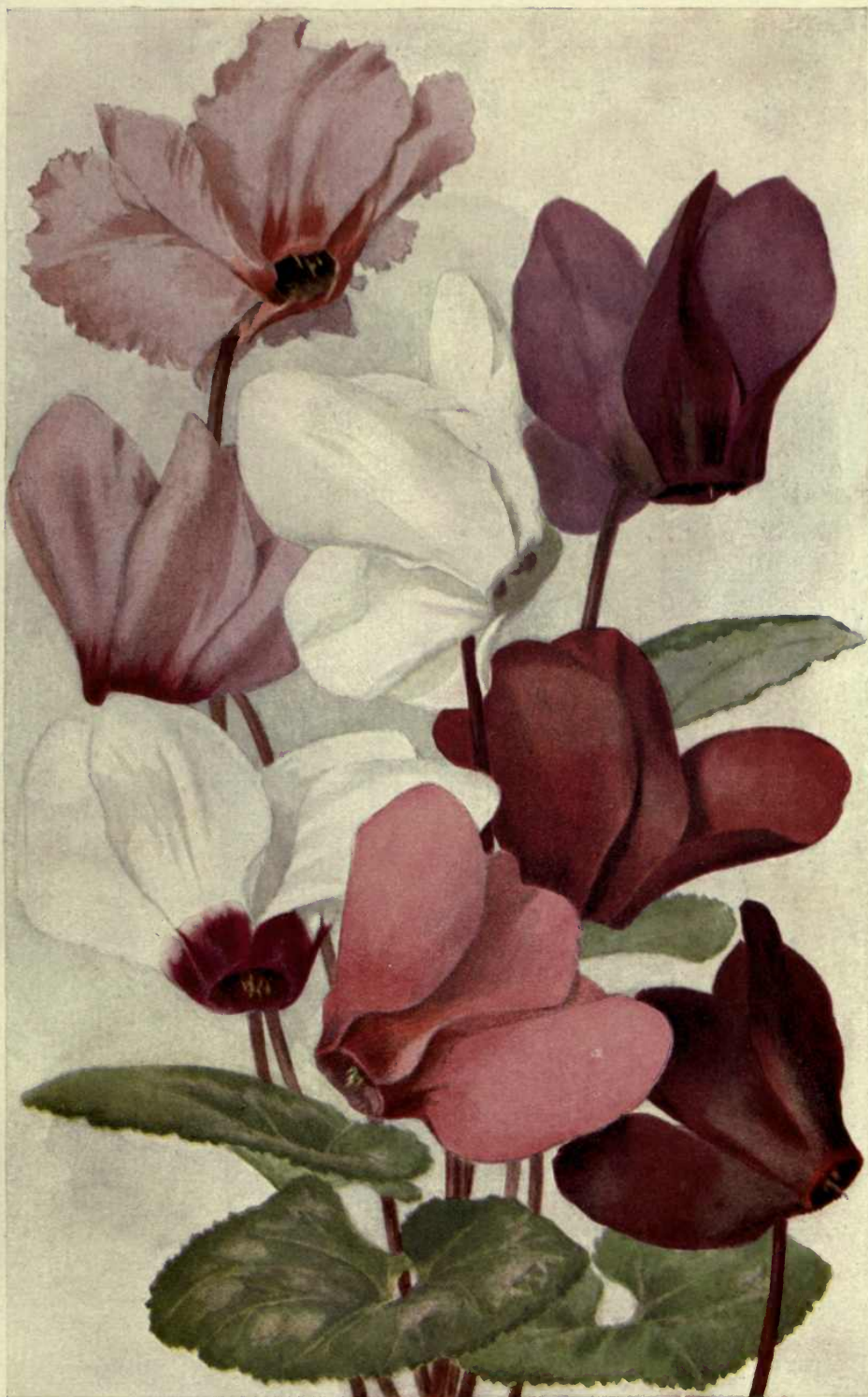
Cyclamen latifolium.—This is much better known in gardens as *C. persicum*, or the Persian Cyclamen. It has been in cultivation for nearly two hundred years, and in that time vast improvements have been made by selection and cross-fertilization. The Persian Cyclamen, as we will still call it, is universally popular, and great displays of it are made every winter and spring

at exhibitions by firms who make a speciality of producing seed of the finest strains.

As a market plant large numbers are grown every year, as the prices ranging from 9s. to 18s. per dozen for well-grown plants still make it a fairly remunerative crop. These prices, however, are somewhat lower than used to be realized some years ago. Although a perennial plant, and capable of flowering annually for many years in succession, market growers prefer to raise their plants from seed every year. Indeed there is no other course open to them, as they are anxious to dispose of all they grow each year.

The seeds are generally sown in July and August, and, as they germinate somewhat irregularly, it is possible to have plants flowering in succession the following year from one and the same sowing. Some growers sow the seed in October and early November, and make another sowing in January or February, in this way making quite sure of a successional crop.

Pots or shallow pans are used, and care is taken to drain them well with plenty of clean broken crocks at the bottom. The compost used is a mixture of rich turfy loam and well-rotted leaf mould in about equal proportions, to which a liberal supply of coarse silver sand is added to secure porosity and ventilation. The pots or pans are filled up to within $\frac{1}{4}$ in.



(28)

PERSIAN CYCLAMEN

1. Sutton's Superb Fringed. 2. Sutton's Giant Rose Pink. 3. Crimson White. 4. Salmon Pink.
5. Vulcan. 6. Sutton's Giant Crimson. 7. Giant White. 8. Giant Purple.

of the top, the soil being pressed down firmly and made level. The hard grain-like seeds are then placed about 1 in. apart, and afterwards covered with the fine sifted gritty compost, about $\frac{1}{4}$ in. deep. Some growers make up the seed pots first, and afterwards dibble the seeds in. In any case, after sowing, the soil should be gently watered with a fine-rosed can, and covered with a sheet of paper, piece of glass, or a little coconut fibre to keep the surface cool and moist.

When the seeds are sown in October and November the minimum night temperature should not sink below 45° F., and the seed pots may be placed in a cold frame for two or three weeks, after which they may be transferred to a greenhouse having a night temperature of 55° F. The sowings in January and February may be made in a temperature of 60° F.

As germination takes place, and one young leaf after another makes its appearance, the seed pots should be placed on shelves as near the light as possible, and the coverings of glass or paper should be removed. Good sturdy growth will thus be encouraged, and with careful and judicious watering and sprinkling overhead the young plants will be fit for pricking out in a few weeks.

When the plants are large enough to handle easily, and the young tubers begin to swell, that is the best time to transfer from the seed pots, and give the seedlings more air, space, and light. Each little plant may be placed by itself in a small pot 1 to 2 in. in diameter; or ten or twelve may be pricked out into a 5-in. (48) pot. The compost should be rich, turfy loam and leaf mould in equal proportions, with a fair sprinkling of coarse silver sand, the whole being passed through a sieve with a $\frac{1}{4}$ -in. mesh.

Care must be taken not to bury the seedlings too deeply in the soil in case the young growths are crippled. It will be sufficient if the base of the leaf stalks is flush with the surface of the soil. In a temperature of 65° to 70° F. the young plants grow freely, and make plenty of roots. When first disturbed they must be shaded from strong sunshine, and care must be given to watering and sprinkling overhead.

As soon as the little pots are full of roots, or the plants are getting too close together, they must be repotted. Each one is then placed in a 3-in. or 3½-in. pot, using a similar compost as described. In due course, with proper attention to shading, watering, sprinkling, and ventilation, these pots become full of roots, and the plants will then be ready for the final potting. Most of them will be fit for 5-in. pots (or 48's), but some of the larger and more sturdy specimens may be placed in 6-in. pots (32's).

This final potting will take place from June to August and September, according to the development of the plants, and as they are desired to bloom in succession. The soil to be used should be the same as before, namely, rich, turfy loam and well-decayed leaf mould in equal proportions, with somewhat less silver sand. A little well-rotted cow manure may also be added on this occasion, and if the heap of compost has some basic slag sprinkled over it and well mixed in, it will produce excellent results, as it contains lime and phosphates, both valuable and slow-acting *Cyclamen* foods.

As on previous occasions, the plants after the final potting must be shaded from strong sunshine until they have recovered from the disturbance. Afterwards plenty of air and diffused light may be given. The watering must always be carefully attended to, as too much or too little has an injurious effect on the plants. Gentle sprinklings of the foliage in the mornings and late afternoons are also beneficial. As strong sunlight produces a yellowish tint on the leaves it should be avoided, and the plants during the summer months should be placed in frames, or houses facing any point between the north-east and north-west. They should be as near the glass as possible, and the pots should be stood on beds or stages covered with moist pebbles or finely broken coke or clinkers. By September plants grown outside in frames should be brought into the greenhouse and placed as near the glass as possible, by standing them on inverted pots or on shelves or stages fixed up for the purpose.

About six or eight weeks before bloom is expected the plants may be "fed" with a little weak liquid manure two or three times weekly. Half a bushel of soot, $\frac{1}{2}$ bus. of cow manure, and 2 or 3 lb. guano put into a bag and sunk in a tub of water will make a good liquid manure, $\frac{1}{2}$ pint of which to 1 gal. of clear water will be sufficient. Once the plants are in blossom the temperature should not be kept too high; from 45° F. at night to 55° F. by day will suit them perfectly. Very little water is required at this period, and great care must be taken to keep the atmosphere in a dryish state, although a humid atmosphere is essential during rapid growth. Grown in the way indicated it is possible to have the Persian Cyclamen in bloom within twelve months of the date of sowing the seed, and the tubers will be from 2 to 3 in. in diameter, and carry from 40 to 60 flowers, and even more in special cases.

As to insect pests, the worst of these are Red Spider, thrips, and green-fly. The first named generally appears when the atmosphere is too dry; consequently the best antidote to it is to keep the air in a cool and fairly moist condition. The other pests may be kept in check by syringing the young plants with any of the recognized quassia, soft-soap, and nicotine washes. Where the glass is in good condition, however, and the houses and frames can be kept close, it will be found best to vaporize as soon as the pests first appear.

The cost of growing Cyclamen is perhaps greater than with other classes of pot plants. Taking 1000 as a unit, the cost for pots, soil, and labour may be put down at £20, but where several thousands are grown the cost would be much less—although pots and soil are always expensive items. Then a certain amount must be allowed for market expenses, freight charges, coal and coke, insecticides, rent, &c., so that a gross return of 12s. to 18s. per dozen is by no means excessive.

[J. M.]

Cyperus alternifolius.—This is still grown, but not in such large numbers as formerly. It is a native of Madagascar and has erect green stems with whorls of flattish bright-green leaves, which are narrower in the variety *rigidus*. The plants may be raised from seeds sown in a

stove temperature and in rich loamy soil; and also by dividing the old clumps into pieces. The plants are chiefly used for furnishing and decoration. There is a variegated kind but it is rarely grown. Another species, *C. laxus*, is grown for market also. It is ornamental in appearance, but somewhat looser in habit than the first-named. There is also a variegated form of it. Plants in 5-in. pots (48's) fetch from 4s. to 6s. per dozen in market.

Cytisus racemosus (or *fragens*).—Popularly known as “Genista” in the trade, this charming Leguminous plant from the Canary Islands has for many years been cultivated in thousands by market growers as a winter-flowering shrub. Plants are raised from cuttings of the half-ripened shoots inserted in very sandy soil in March and April, about three dozen being placed in a well-drained 5-in. or 6-in. pot. If kept close and warm they root in five or six weeks, and may then be moved singly into small pots. As these become filled with roots, the young plants are transferred to 4-in. or 5-in. pots and grown on steadily in genial warmth and moisture. The tips of the shoots are pinched out from time to time to make the plants bushy. During the summer months more air is given to harden the plants, and they are grown steadily throughout the autumn and winter months in a greenhouse temperature. In March following they will be large enough to move into 5-in. and 6-in. pots, using a compost of good yellow loam with a dash of silver sand and leaf mould, or well-rotted manure, and potting firmly. During active growth the plants are syringed daily, this being necessary not only to promote growth but also to check attacks of Red Spider. By the following winter, plants thus grown become fine bushy specimens, each shoot being laden with a truss of bright golden-yellow flowers. Plants in 5-in. pots realize from 6s. to 12s. per dozen, higher prices being obtained for particularly fine specimens in larger pots. The variety *superbus* is superior to the ordinary form, and is remarkable for its fragrance.

Datura (*Brugmansia*).—A genus of herbaceous and shrubby plants, the latter being perhaps best known as “Brugmansia”. They are used for subtropical effects in summer bedding. The annual kinds are easily raised from seeds sown in heat in spring, and include the following: *cera-tocaula*, 2–3 ft., with ovate lance-shaped leaves and sweet-scented white flowers tinged with purple; *chlor-antha* 2–3 ft., yellow, the double form with two or three trumpet-shaped



FIG. 277.—*Datura sanguinea*

corollas inside each other being the best; *Cornucopia*, 1–2 ft., purple and lilac mottled; *fastuosa*, 2–3 ft., white inside, violet outside, with two or three forms; *Metel*, 2 ft., white; *quercifolia*, 1–2 ft., violet; and *Stramonium*, 2 ft., white with a few varieties. Amongst the shrubby kinds are *arborea*, 7–10 ft., white; *cornigera*, 3–10 ft., white, with a fine double-white variety called *Knighti*; *sanguinea*, 4–8 ft. (fig. 277), orange yellow. These are easily raised from cuttings of the young shoots in sandy soil, plunged in bottom heat in spring.

Desmodium gyrans (TELEGRAPH PLANT).—This stove plant is grown as a curiosity, its narrow oblong leaves being constantly in motion up and down, like the arms of a semaphore. It flourishes in a loamy soil, and is raised from seeds.



Fig. 278.—*Dipladenia atropurpurea*

Dieffenbachia.—A genus of ornamental Aroids easily grown in loam in the stove, and raised by cuttings. Some of the best kinds are *Bausei*, *Fournieri*, *Jenmani*, *Leonæ*, *picta*, *Rex*, *Shuttleworthi*, *nobilis*, &c.

Dipladenia. — A genus of stove climbers requiring a peaty soil and raised by cuttings. *D. amabilis* is a well-known hybrid with purple-crimson flowers; *D. Brearleyana*, rich crimson; *D. atropurpurea* (fig. 278), crimson-purple; *amæna*, *splendens*, *crassinoda*, *eximea*, *illustris*, *Sanderi*, and *speciosa* are also good plants.

Dracæna.—The coloured-leaved *Dracænas* are exceedingly numerous, and as table plants they are much admired. They are essentially stove plants, and need considerable care in their culture, as the loss of a single leaf will often destroy the symmetrical character of a specimen and greatly depreciate its value. The members of this section are increased in different ways. The best plants for propagating purposes are those with tall naked stems. Such as these may have the top removed and inserted as a cutting in a pot of sandy soil. The stems may also be cut up into lengths of 3–4 in., laid in a bed of coconut fibre, and be covered to the depth of $\frac{1}{2}$ in.; while lastly the underground rhizomes, or “toes” as the propagator terms them, may be treated in the same way. It is essential that the bed of coconut fibre should have a fair amount of bottom heat, and stove temperature must of course be maintained. From the buried stems young shoots will be pushed up from every joint, and when they are large enough, and have formed roots of their own, they may be

potted singly. A mixture of equal parts of loam, leaf mould, and peat, with nearly a part of sand, will suit these *Dracenas*. When shifted into 5-in. pots a little more loam and a sprinkling of bone meal will be beneficial. Even after they are shifted it is an advantage to keep them plunged in a gentle bottom heat. Good old varieties still worth growing are *Cooperii* and *terminalis*, while of others may be mentioned *angustifolia*, *Jamesii*, *Lord Roberts*, *Lord Wolseley*, *Prince Manouk Bey*, and *Sanderiana* (fig. 279). *D. deremensis* *Warnecki* is a graceful new variety having arching leaves 12–18 in. long, 2 in. wide in the middle, with a conspicuous white stripe on each side. Other kinds are *Godseffiana*, with elliptic golden-spotted leaves; *Victoria*, broad leaves striped green on a yellow ground; *Goldiana*, pea green striped with dark green.

[W. T.]

Echites.—The best-known kinds are *argyrea*, with silvery veins; *nutans*, red veined; and *rubro-venosa*, similar. They are stove climbers, liking peaty soil, and are raised by cuttings.

Epacris.—A genus of pretty Australian Heath-like plants requiring greenhouse treatment, and a compost of sandy peat. The long narrow tubular flowers droop from the shoots in profusion, and are deep crimson, white, pink, or red in colour. Not so much grown now as formerly. Raised from cuttings.

Episcea (Cyrtodeira).—Pretty stove trailing plants with bright-red flowers, the best being *chontalensis*, *fulgida*, and *metallica maculata*. They make nice basket plants, and like peaty soil. Raised from cuttings.

Erythrina.—These are handsome Leguminous plants with large Laburnum-like leaves and bright-red Pea-like flowers. They flourish in rich loamy soil, and are raised from seeds and cuttings. *E. Crista-galli*, from Brazil, has thick rootstocks and stems 4–6 ft. high, produced annually; *E. herbacea* has long arching racemes of flowers, and *E. Humeana*, from South Africa, is a bush, 8–10 ft. high, with long racemes of scarlet blossom. They all flourish in a warm greenhouse. *E. Parcelli* and *E. marmorata* like warmer treatment, and are remarkable for the pretty variegated leaves.

Eucalyptus.—A very large genus of Australian trees, some of which



Fig. 279.—*Dracena Sanderiana*

are the tallest in the world, 400–500 ft. high. The best-known kinds are *globulus*, the “Blue Gum Tree”, with large grey-green leaves. It is easily raised from seeds in a warm greenhouse, and is much used for subtropical bedding in summer. *E. citriodora* is a smaller-growing kind remarkable for its delicious lemon scent, almost exactly like that of the Lemon-scented Verbena (see p. 125). A few kinds are grown in the open in the mildest parts of the kingdom, one of the best for this purpose being *urnigera*, which has attained a height of 80 ft. in places.

Eucharis grandiflora (*amazonica*).—This fine Colombian bulbous plant is still valued as a market crop. It flourishes in rich and rather heavy



Fig. 280. — *Eucharis grandiflora* (*amazonica*)

loam with a little well-decayed manure or leaf mould and sand. Stove treatment is necessary, and plenty of water during growth and frequent syringings to keep the foliage clean. When coming into bloom a little weak liquid-manure water may be given occasionally. The pure-white flowers are packed in shallow boxes in cotton wool, about two dozen flowers to a box, prices ranging from 1s. to 10s. per dozen according to circumstances during the winter months. When several bulbs are placed in large pots or tubs, they grow well for several years without repotting, although they receive, perhaps, an annual topdressing. To keep the plants free from Mealy Bug, scale, and Thrips, the syringe should be freely

used, with nicotine or quassia solutions occasionally. Sometimes the mite is troublesome, perhaps owing to too high a temperature, and badly infested bulbs should be burned. Others may be dipped in a strong solution of permanganate of potash. Other species of *Eucharis* are *Bakeriana*, *Mastersi*, *Sanderiana*, *Lowi*, all with white flowers but not so valuable as *E. grandiflora* (fig. 280).

Eupatorium.—These are easily grown Composites with Ageratum-like flowers, white or reddish purple. They are raised from cuttings in spring, and require greenhouse treatment in winter. The best kinds are *atrorubens*, *riparium*, *trapezoidum*, &c.

Eurya latifolia variegata.—A beautiful Japanese greenhouse shrub of the Camellia family, with oblong lance-shaped leaves variegated with creamy yellow. As it can only be raised from cuttings of the young shoots, and is not a particularly rapid grower, its trade is somewhat

restricted. The cuttings root in sandy peat and loam in bottom heat, and the young plants are grown on as rapidly as possible in a warm moist atmosphere, and are frequently syringed to keep the foliage clean and bright. When hardened off they stand well in cool places.

Exacum macranthum.—Lovely stove Gentianworts, mostly from Ceylon, are raised from seeds or cuttings, and flourish in a mixture of sandy peat and loam. The best kinds are *affine*, bluish lilac; *Forbesi*, deep blue; *macranthum*, rich violet purple; and *zeylanicum*, violet—all about 9 in. high.

Ficus elastica (INDIARUBBER PLANT).—This is still largely grown for market. The large elliptic glossy-green leathery leaves constitute the chief ornamental feature, and when coupled with the fact that the plants will stand almost as rough treatment as the *Aspidistras* one need not wonder at its popularity. It is easily raised in the same way as *Dracænas* by taking off the tops of the plants, and also by cutting the stems up into one-eyed pieces with a leaf, and plunging them in bottom heat in coconut fibre, or leaf mould. The overhead temperature at this time is kept up to 75° or 80° F., and a very humid atmosphere is maintained. Single leaves root readily, but will not throw new shoots. Once rooted the young plants are potted up in 3-in. and afterwards into 5-in. pots and grown on quickly for sale. They are gradually given more air and light and a lower temperature, to enable them to stand the rough usage of transit. The prices realized now are lower than in former years, being 9s. to 12s. per dozen for plants in 5-in. pots.

Another species of *Ficus*, namely *F. pandurata*, with large fiddle-shaped leathery leaves, has attracted the attention of one or two large market growers of late years on account of its ornamental appearance. It is a stove plant and requires abundance of moisture and heat to bring it along quickly. Quite nice plants can be obtained in 5-in. and 6-in. pots, and their culture pays at 2s. 6d. to 5s. per plant. Other ornamental-leaved *Ficuses* are *macrophylla*, with larger but narrower leaves than *F. elastica*; and *nymphæaefolia*, with large heart-shaped leaves, but they are not yet known amongst market growers. Another species, *F. Canonii*, also known as *Artocarpus Canonii*, is often met with in nurseries, and is remarkable for its beautiful bronzy-purple leaves.

There are a few popular climbing species, amongst the best being the well-known *F. repens* and its variety *minima*, so useful for clinging to walls in warm greenhouses and stoves, covering them with a dense mass of small green leaves. *F. radicans* and its variegated form is another scandent *Ficus* in which a fair trade is done by nurserymen; and the same may be said of *F. Parcelli*, from Polynesia, an ornamental species having the bright-green leaves irregularly blotched with ivory white and deep green.

Freesia.—The most generally useful kind for market work is *F. refracta alba*, which has almost pure-white tubular blossoms borne in graceful trusses during the winter season. The cut flowers are largely

used by florists, and the prices realized by growers are often remunerative—although the bulbs cost 30s. or more per 1000 at first. Several fine hybrids have been raised of late years, and there are now soft-yellow, orange, and pink varieties obtained from crossing *refracta* with the pink form known as *Armstrongi*. The American growers have a fine variety called “Purity”, which they grow in hundreds of thousands. It is probably identical with the best forms of *alba*. The following extract on *Freesia* culture is taken from *The Bulb Book* (J. Weathers).

CULTIVATION.—“The bulbs should be obtained as early in August as possible, and the pots in which they are to be placed should be well drained with a layer of crocks over the bottom. Although *Freesias* will grow in any light rich soil, that which appears to suit them best is a compost of 2 or 3 parts fibrous loam, 1 part leaf soil, and 1 part peat, with a little silver sand or grit. Some growers add a little well-decayed cow-manure, but sometimes the plants are a failure when this is the case. Others use no manure from the cow or horse, and obtain excellent results from loam, peat, leaf soil, and sand. The bulbs should be placed about $1\frac{1}{2}$ –3 in. from each other in the pots (three to five bulbs to a 5-in. pot), and should be covered with about 1 in. of compost. This should be pressed down fairly firm with the fingers, and afterwards gently watered to settle it. The bulbs thus potted should be placed in a cold frame on a moist bed of ashes or cinders, or even out-of-doors in a sheltered corner, covered with coconut fibre or fine ashes. When growth has well started and the leaves are 3–4 in. above the soil, a few slender twigs or sticks should be inserted round the rims of the pots to keep the foliage from toppling over. Some judgment is required in watering, care being taken not to give too much on the one hand, or too little on the other. The quantity given will depend largely upon the activity or otherwise of the growth. On the approach of frost, say about the end of September or early October, the plants must be taken from the cold frame in which they were started and transferred to a greenhouse with a temperature of 50° to 60° F. All the bulbs need not be brought in at once, and where a succession of blossom is required in winter and spring, it will be necessary to have batches in several stages of development. As the flowers wither they should be cut off (unless seed is required), and by gradually lessening the supply of water to the roots the leaves begin to fade and the bulbs may be left resting in the pots until the following August or September.

FREESIAS FROM SEEDS.—The *Freesia* is one of the few bulbous plants that is not only easily raised from seed but comes into blossom well within a year after the seeds are sown. Seedling varieties are now becoming popular. It must, however, be remembered, that one cannot guarantee any particular variety coming “true” from seed, and many inferior forms may also be anticipated. Where any special variety is required it can only be kept true by propagating it from offsets from the older bulbs.

“To raise *Freesias* from seed, a rich sandy compost should be prepared by passing some fibrous loam, leaf mould, and sand in about equal pro-

portions through a sieve. This compost should be placed in well-drained 5-in. or 6-in. pots, up to within about $1\frac{1}{2}$ in. of the rim. From five to six seeds should be placed on the surface in each pot, and afterwards covered with about 1 in. of gritty mould; or several seeds may be sown in the same way, afterwards thinning the seedlings out, to leave only five or six plants in each pot according to size.

"The best times for sowing Freesia seed is from January to March and April and again in August; but it may be sown at other seasons if more convenient. It is safer to place the seed pots in a greenhouse, and in a temperature of 60° to 65° or even 70° F. germination takes place in five or six weeks. Watering is attended to carefully, and plenty of air and light are given, although the tender seedlings must be shaded from strong sunshine. If it becomes necessary to repot Freesia seedlings, care should be taken to handle the roots gently, as they are extremely brittle and easily injured. During the summer months the seedlings may be stood out-of-doors in an open, partially shaded and sheltered spot. On the approach of frost, however, they must be transferred to the greenhouse with a temperature of 55° to 65° F. and placed on a shelf near the glass."

Fuchsia.—As market plants Fuchsias are always held in great esteem, and are grown in large numbers in pots and also in a small state in boxes to supply the street trade. Thousands are raised from cuttings annually in spring and when grown on in heat soon make fine sturdy plants, fit for 5-in. pots. A stick is put to each plant and the side shoots are looped up with thin strands of raffia. Not only are they useful for bedding purposes, but also for window boxes. Some nurserymen train the plants as standards for special purposes, and secure higher prices in consequence.

Amongst the best single varieties for market are the following: *Charming*, red sepals, purple corolla; *Cupidon*, pink sepals, magenta corolla; *Display*, rose sepals, mauve corolla; *Lady Haytesbury*, white sepals, purple corolla; *Mrs. Marshall*, white sepals, rose corolla; *Mrs. Rundell*, white sepals, orange corolla; *Scarcity*, red sepals, deep-red corolla; *Starlight*, white sepals, pink corolla; *Try-me-ho*, white sepals, purple corolla.

Among the doubles are *Avalanche*, scarlet sepals, dark-blue corolla; *Ballet Girl*, scarlet sepals, white corolla; *Gertrude Pearson*, red sepals, purple corolla.

In addition there are a host of other varieties and several natural species that are grown for private collections.

Gardenia.—These are generally grown to supply cut flowers, which at all times, but especially during the winter and early spring months, are in considerable demand. Plants are readily struck from cuttings, taken any time during the growing season, and inserted in a moderate bottom heat. For cut blooms, Gardenias are generally planted in borders, as if long in pots the tips of the shoots are apt to turn yellow, and greatly depreciate the crop of blossoms. In planting out Gardenias effective drainage must be ensured, and the bulk of the soil should consist of good turfy loam. As Gardenias are pronounced surface rooters, space

should be allowed for an occasional topdressing. With ample drainage, water may be freely given, both at the roots and overhead. Insect pests may be kept down by syringing with paraffin emulsion. Liquid manure and soot water combined is one of the best stimulants that can be employed. To obtain flowers in the depth of winter a minimum night temperature of 60° F. will be necessary. Ten degrees less may, however, be safely allowed in the case of plants required to bloom in early spring. In packing the flowers it must be borne in mind that they are very easily bruised, for which reason they are best packed in shallow boxes in a single layer, the box being lined with wadding, slightly damped, and covered with tissue paper.

When the soil is badly drained, and perhaps also too rich with humus and artificial fertilizers, and the temperature is kept too high, the roots of Gardenias are often afflicted with Eelworm (*Heterodora radicola*), and become irregular masses, useless for absorptive purposes. The soil should be well drained and dressed with lime or basic slag. [W. T.]

Gesnera.—A large genus of hairy-leaved plants, many with tuberous roots, and closely related to Gloxinia. The tubular flowers are glowing scarlet or orange in colour, and droop from branched stems. There are now many lovely garden hybrids, one of the best being *nægelioides*, with bright rosy-pink flowers having a yellow throat. There are, however, numerous variations of this, including some with flowers of deep-violet, red, lilac, white, pink, and other shades. At present there is no great trade done in these lovely plants. They are easily raised from seeds, and may be treated in the same way as Gloxinias.

Gloxinia (or Sinningia).—Popular stove or greenhouse tuberous plants with hairy fleshy leaves, large tubular flowers with exquisite shades of colour and variously blotched and speckled. They are easily raised from seeds sown on nicely prepared gritty soil between January and March, and again in June and July, in a temperature of 70° to 75° F., and plants may be had in flower in six months' time. Old stock plants may have the tubers divided, or new plants may be raised from incisions made across the midrib and main veins of leaves pegged down on gritty soil or leaf mould. Once established, Gloxinias will grow in a cooler atmosphere and will last longer in blossom. For wreaths, crosses, bouquets, &c., it is astonishing how long the flowers of cool-grown Gloxinias will last, but they are very rarely used in this way by florists.

Grevillea robusta.—This graceful Fern-like Australian plant is largely grown for market. It is raised from seeds sown in heat in February or March in pots or shallow boxes in sandy soil. The young plants soon appear, and when 2 or 3 in. high are placed singly in small pots, in which they are grown on quickly. They are again moved into 5-in. pots, either singly or in pairs, being potted rather firmly in a compost of gritty loam and leaf mould. They are grown during the summer months in a fairly moist atmosphere, and are shaded from strong sunshine. By autumn the plants are marketable size and sell during the winter months, realizing

from 9s. to 18s. per dozen. If hardened off before sale, the plants last fairly well and will not drop the lower leaves. Older and bigger plants are useful for subtropical bedding during the summer months.

Heaths or Ericas.—Many thousands of Heaths are sold annually during the winter season, the demand apparently being as great now as ever. At one time no Heath was ever sent to market in any pot smaller than a 5-in. one or 48, and it took three seasons to grow. Now, however, tiny Heaths may be seen in flower in pots from 2 in. in diameter and upwards—pretty bushy little plants that command a ready sale. The

varieties mostly grown in a small state are *Erica caffra*, *E. gracilis* and its variety *nivalis*, *E. melanthera*, and *E. persoluta*. These make bushy specimens, covered with bloom, and realize from 3s. 6d. per dozen upwards in the smaller sizes. Thousands of plants are sold in 5-in. pots, chiefly of *E. gracilis* and *E. hyemalis*—the last-named (fig. 281) being particularly handsome with its white and rosy-pink tubular flowers. In the variety *alba* they are almost pure white. Good specimens usually fetch from 10s. to 12s. per dozen in 5-in. pots. *E. melanthera*, which has globular pinkish flowers with black anthers, usually realizes higher prices, but is not so extensively grown. Other kinds of Heaths met with in smaller quantities are *E. Willmorei*, which resembles *E. hyemalis* in appearance, but usually flowers later; *E. candidissima*, dwarf growing, with white bell-shaped flowers; *E. ventricosa*, a fine bushy species, having flowers varying from white to red; and *E. Caven-*



Fig. 281.—*Erica hyemalis*

dishiana, a strong-growing kind. The kinds mentioned are all propagated from cuttings. These are taken from the tops of the young half-ripened shoots, generally in spring, and are usually inserted in 5-in. pots. These are carefully drained by filling about two-thirds with crocks, the rougher ones being at the bottom. Over the crocks is placed a layer of fibrous peat or moss before the layer of sandy peat. Over the sandy peat is a layer of silver sand, which brings the prepared surface to within 1 in. of the rim. The cuttings are taken off with scissors or a keen-edged propagating knife, and are inserted about $\frac{1}{2}$ in. deep and about $\frac{1}{2}$ in. apart. In this way the tops are lower than the rim of the 5-in. pot, which will hold about 200 cuttings. The older Heath propagators, after gently watering the cuttings and allowing

to dry, usually placed bell glasses over the cuttings. Modern growers use a flat sheet of glass instead. This is better than the bell glass, as it has simply to be inverted each day, putting the dry side beneath, whereas when bell glasses are used a certain amount of time must be devoted each day to taking them off and wiping the interior dry with a piece of cloth.

The cuttings are placed in a temperature of about 60° F., and the glasses are kept on until they are well rooted. The sand is never allowed to become dry, but care is taken to avoid too humid an atmosphere, as this causes the cuttings to damp off.

The rooted cuttings are potted up when ready, usually in the autumn and early spring. While still in the cutting pots they have the tops cut out to induce branching. Afterwards, when placed either trebly or singly in small pots, they are kept close for some little time to get established, after which more air is given. The tops are nipped off again in due course, and during the summer months the plants are grown in cold frames with ash or cinder bottoms so as to be quite near the glass.

Heaths are usually potted very firmly in a soil composed of soft turfy peat with a liberal supply of clean silver sand to keep it porous. The pots are well drained, and are not used too large for the plants. The small Heaths which now form such a conspicuous feature of the market are usually brought to the flowering stage in about twelve months, but larger plants in 5-in. and 6-in. pots take about three seasons to grow. The first two seasons they are cut hard back in winter, and when new growth commences they are moved into larger pots.

During the period of growth, watering is carefully attended to, and on all favourable occasions abundance of light and air is given when established. When the flowering stage is approaching for plants in 5-in. and 6-in. pots, they often receive weak doses of liquid manure, the plants in many cases being plunged out-of-doors in beds of ashes or fibre during the summer months. Very little artificial heat is given to the plants, and in the event of severe weather those in pits or frames are protected with one or more layers of mats or canvas.

Heliconia.—A genus of fine foliage stove plants, with large Canna-like leaves, all flourishing in rich loamy soil with plenty heat and moisture. The best kinds are *aureo-striata*, green veined with yellow; *illustris*, crimson; *spectabilis*, bronzy green; *psittacorum*, green with orange and crimson bracts. All increased by division.

Heliotrope (CHERRY PIE).—As a market plant the Heliotrope (*Heliotropium peruvianum*) has long been popular, and is still grown on fairly large lines for bedding-out purposes in summer. Early in the year cuttings of the young shoots are inserted in pots or shallow boxes of sandy soil and placed in a warm greenhouse. There are many varieties, varying in colour from pure white to deep violet, including the following: *White Lady*, white; *Queen Marguerite*, deep blue; *Swanley Giant*, bright blue; *Mina*, blue; *Miss Nightingale*, purple, a very popular sort; *President Gar-*



HIPPEASTRUMS GROWN FOR THE FLORIST TRADE



HYDRANGAEA PANICULATA GRANDIFLORA IN BLOOM

field, mauve purple, &c. Standard and half-standard plants are popular in public gardens as "dot" plants over Begonias, Fuchsias, and other plants of a dwarfer nature.

Helxine Soleirolia.—A curious Urticaceous plant, with slender stems and small roundish bright-green leaves produced in such density as to make a pretty evergreen carpet in the greenhouse border, or when grown in pots. It grows rapidly, and soon spreads itself everywhere under glass. It is a native of Corsica and Sardinia, and is almost hardy in places.

Hippeastrum (fig. 282).—The garden varieties, still known under the name of *Amaryllis*, have been evolved from the South American species *H. vitattum*, *H. Regiæ*, *H. paradinum*, and *H. Leopoldi*, by crossing and intercrossing during the past eighty years. Some magnificent varieties are now in cultivation, but the trade is confined almost exclusively to a few nurserymen. Attempts have been made to popularize *Hippeastrums* as market plants, but without much success. The plants are easily raised from seeds, and the bulbs attain flowering size in from two to three years. Established plants may be kept green throughout the year, but it is usual to give them a rest. When growth commences, the bulbs are repotted into pots not too large, and a rich compost of fibrous loam, leaf mould, and old cow manure, with a dash of silver sand, is used.



Fig. 282.—*Hippeastrum* (*Amaryllis*)

The atmosphere is kept warm, and also moist by frequent syringings. Water is supplied abundantly during growth, but is gradually lessened as the plants go to rest. Fine specimens have leaves 3 to 5 ft. long and 3 to 4 in. broad, while the flowers are from 6 to 10 in. across. (See *The Bulb Book*, p. 275.)

Humea elegans.—An Australian biennial with large leaves and erect graceful plumes of drooping small pinkish flowers, which emit a peculiar odour. Increased from seeds, and sold in a small state in boxes or pots in spring.

Hydrangea.—Of the thirty odd species known, only two have found favour with market growers, viz. *H. Hortensia*, from China, and *H. paniculata*, from Japan. *H. Hortensia* is perfectly hardy in the mildest parts of the kingdom, and makes splendid flowering bushes. For market work, however, plants are usually grown in 5-in. and 6-in. pots, and are raised annually from cuttings of the half-ripened shoots. These are obtained

from old stock plants, and are inserted in spring, autumn, and winter, according to the times they are required. Cuttings inserted singly in small pots in May in a sandy soil soon root, and are afterwards potted firmly into 5-in. pots. During the summer months they remain in the open air to ensure thoroughly ripe growth by exposure to the sun and air. The best compost is turfy loam with a dash of sand and a little well-rotted manure or leaf mould, and perhaps a sprinkling of basic slag to impart vigour and substance to the flowers. From October or November onwards the plants are grown under glass in cold frames, and batches are taken into a warm greenhouse to bring them into early bloom. When coming into flower, weak manure water may be given occasionally. If a blue colour is required in the flowers it can be produced by watering with a solution of alum water. Some growers use iron filings or coal dust mixed with the soil for the same purpose. The best white-flowered varieties are "Thomas Hogg" and "E. Moullière". Hydrangeas of the *Hortensia* section can be had in bloom from twelve to fifteen months from cuttings, and with heads of flowers 12 to 15 in. across.

H. paniculata is quite distinct from *H. Hortensia*. In Japan it forms a dense round-headed tree 25 ft. high, with a trunk 6 in. in diameter. For market work plants about 2 ft. high are usually grown in pots, the variety known as *grandiflora* being most popular. A rather heavy loamy soil, with a little leaf mould or well-rotted manure, is a suitable compost. When the leaves have fallen, the plants are pruned hard back to three or four eyes. From each of these a long shoot is developed in due course, and ends up in a fine pyramidal head of flowers 1 ft. or more in length. By moving the plants into a warm greenhouse, or even into a stove temperature, the flowering period is hastened. Fresh stock is raised from cuttings about 6 in. long inserted in sandy soil.

Impatiens.—Perhaps the Balsam (see p. 133) is the best-known member of this genus, but there are a few other species worthy of note, especially *I. Sultani* and *I. Hawkeri*—both lovely bushy plants with bright-red flowers. They are easily raised from seeds or from cuttings, and require warm-house treatment, and a good loamy soil with a dash of sand and a fair sprinkling of leaf mould. Of late years a much more vigorous species—*I. Oliveri*, from Central Africa—has attracted some attention, and has been used for bedding out during the summer months. It may be grown like the other kinds, and will attain a height of 5 to 6 ft., making fine bushy plants covered with large pink, pale rose, or almost white flowers as large as a crown. Handsome little bushy specimens can be obtained in 5-in. pots.

Iresine.—Effective South American plants much valued for massing in beds and borders in summer. *I. Herbsti* with roundish purple and crimson leaves, and its variety *aureo-reticulata* with yellow-veined leaves, as well as *I. Lindenii* with narrow lance-shaped leaves of deep crimson-red, are largely grown in small pots or boxes for the early summer trade. They are raised from cuttings in sandy soil early in spring, in bottom heat,

Isolepis gracilis.—This pretty little grass-like Sedge from Australia has long been cultivated for the ornamentation of greenhouses and for decorative work. It grows readily in any ordinary good open compost, and is increased by division of the tufts, generally in spring, just as growth is about to begin. A night temperature of 60° F. is suitable for establishing the plants, but it may be afterwards reduced by 10 degrees or even more.

Ixora.—These are fine tropical stove shrubs with glowing bright orange-scarlet or yellow flowers in dense heads often nearly 1 ft. across in *macrothyrsa* (Duffi) which has crimson blooms. Some of the best kinds are *Dixiana*, orange; *Fraseri*, scarlet; *lutea*, yellow; *Pilgrimi*, orange scarlet; *Westi*, bright red; &c. Raised from cuttings in loam and peat.

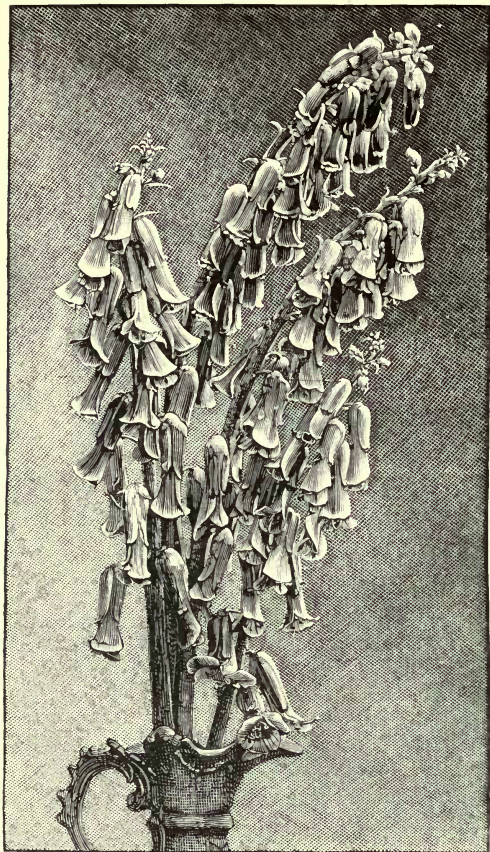
Jacobinia (Justicia).—Stove plants, easily grown in sandy loam and peat, and very ornamental when in bloom. The best kinds are *chryso-stephana*, yellow; *coccinea*, scarlet; *magnifica*, red, with varieties *carnea* and *Pohlana*; *Ghiesbreghtiana*, red, &c. They are all raised from cuttings in spring.

Juniperus Bermudiana (BARBADOS, PENCIL, or BERMUDA CEDAR).—This ornamental Conifer is largely grown by some for decorative work, and plants may be had in pots from 5-in. sizes and upwards to specimens 8–10 ft. high. They are pyramidal in habit and feathery in appearance, and are raised from seeds. Being tender they must be grown in a fairly warm greenhouse to obtain nice saleable plants.

Kalosanthes (Crassula) coccinea.—This South African plant was cultivated extensively some years ago, and is still grown by a few under its old name of *Crassula*. It has erect fleshy stems and ovate triangular fleshy leaves arranged crosswise in alternate pairs. The brilliant-scarlet flowers are borne in flattish clusters at the tips of the shoots. The plants flourish in any ordinary garden soil, and are easily propagated from almost any piece of detached shoot. Cuttings are inserted in pots in a very sandy compost during the spring and summer months. They require but little moisture, and soon root. The young plants are potted up singly in small pots, and the tips of the shoots are pinched out later on, when growth has commenced. At one time fine bushy well-flowered specimens were sent to market in 5-in. pots (48's), and are so still; but many are now sent in 3-in. pots instead.

Kleinia.—Two kinds—*K. repens*, with cylindrical fleshy blue-green leaves; and *K. tomentosa*, with larger spindle-shaped leaves covered with silvery down—are often used for carpet bedding. They are propagated by cuttings, or offsets in sandy soil in spring in a warm house.

Lachenalia Nelsoni (fig. 283).—Of the many species and varieties of *Lachenalia* known, this is the most likely to attract the commercial grower. It is a magnificent hybrid between *L. tricolor* (fig. 284) and *L. aurea*, and produces foot-long spikes of rich-yellow flowers. The bulbs cost wholesale about 30s. per 100, and may be grown in pots, pans, or hanging baskets in an ordinary greenhouse, coming into blossom about March and April. The bulbs should be potted up about August (having had a rest from the

Fig. 283. — *Lachenalia Nelsoni*

previous May), and require but little attention until the leaves begin to appear. Then watering is attended to, and with plenty of light, and a night temperature of 45° to 50° F. during the winter months, the plants come into flower in due course. The spikes may be used as "cut", but pot plants grown like Hyacinths, or hanging baskets as shown in the figure, would probably sell better.

Lantana. — These showy plants with Heliotrope-like flowers are much used for bedding-out purposes during the summer months. They are easily raised from cuttings in spring, inserted in sandy soil in a close frame, being afterwards potted up and hardened off by the end of May or early June. They bloom with great freedom, the flowers being of various shades, such as pure-white, deep-yellow, rose-pink, orange-scarlet, purple-scarlet,

reddish-crimson, and intermediate shades. Fancy names have been attached to many of them, some of the best varieties being *Diadem*, *delicatissima*, *La Neige*, *Distinction*, *Rutilant*, *Ne Plus Ultra*, &c.

Lapageria. — Lovely Chilian plants, remarkable for their long trailing woody stems, smooth glossy-green ovate three-nerved leaves, and large drooping bell-shaped flowers, which are bright rose in *L. rosea* and waxy white in its variety *alba*. The plants are hardy in the mildest parts of the kingdom, and have been noted in full bloom in Cornwall in the open air at Christmas-time. A compost of turfy peat, to which some nodules of charcoal and a fair amount of coarse sand and a little turfy loam are added, suits the plants well. It must, however, be thoroughly well drained, as the plants like plenty of moisture during growth. For market work the white variety is more valuable than the red, and may be grown on the walls or rafters of any greenhouse, or even in corridors between ranges of glasshouses. Propagation is effected by layering the stems, as shown in Vol. I., p. 81, fig. 72, afterwards severing each rooted portion with a new shoot and potting it up separately. A little extra heat may be given

to encourage rapid growth, but once well established the plants require but little artificial heat. Scale is the worst insect pest, but may be kept in check by syringing occasionally with quassia and nicotine solutions. The young shoots are sometimes attacked by Greenfly, but these may be kept down by similar solutions or vaporizing. The same may be said of Thrips



Fig. 284.—*Lachenalia tricolor*, in basket

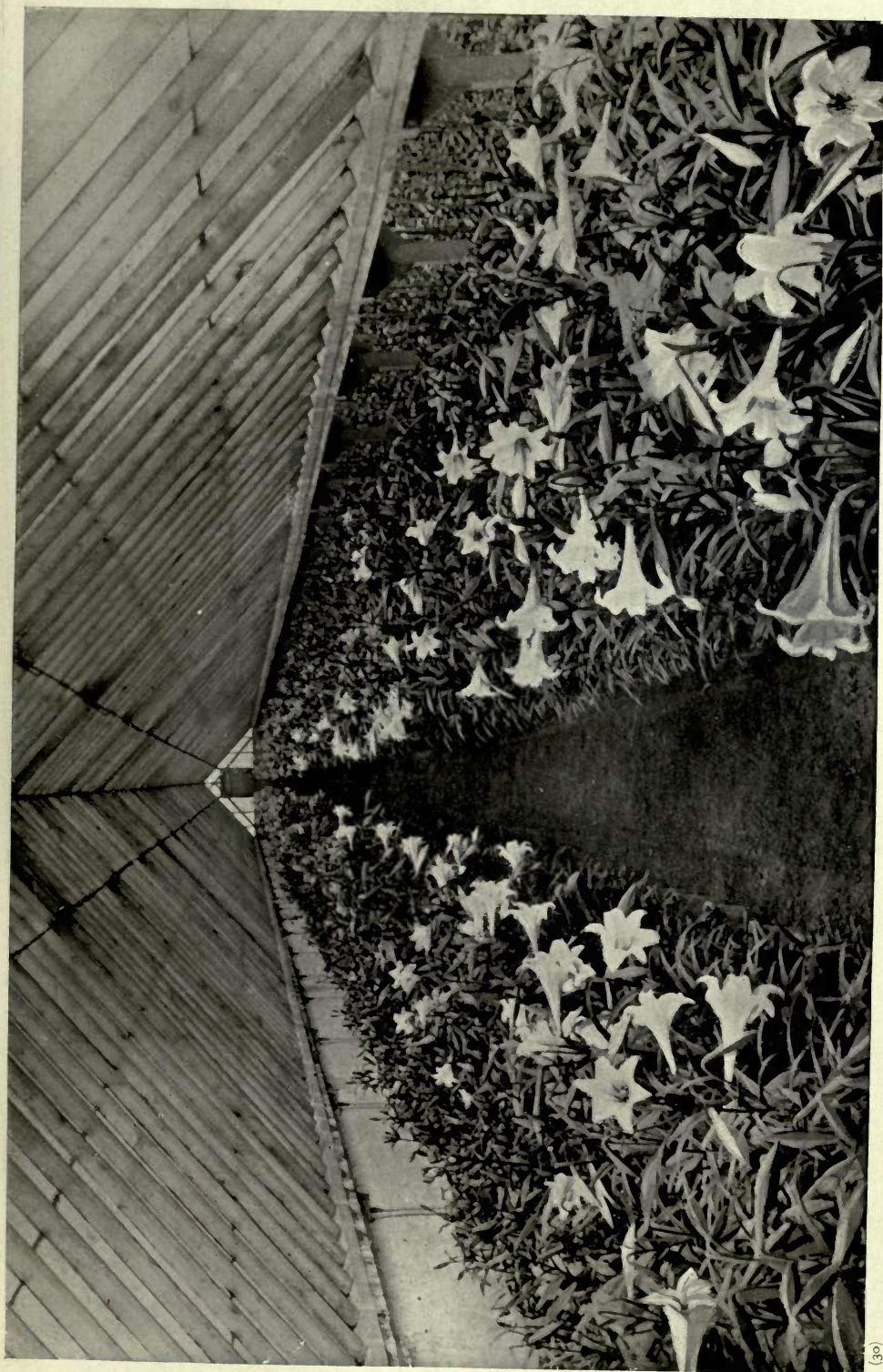
and Red Spider—the appearance of the latter being a sure sign of too dry an atmosphere.

Leucophytum (Calocephalus) Browni.—A distinct-looking stick-like Composite of branching habit, much favoured of late years for carpet bedding on account of its silvery appearance. It is propagated by cuttings in spring.

Lilium.—Although a more or less thriving and increasing trade is done by bulb merchants and nurserymen in the bulbs of a large number of species of *Lilium*, market growers confine their attentions practically to only three species, namely, *L. candidum*, *L. lancifolium* (or *speciosum*), and *L. longiflorum*—the last-named being the favourite.

L. candidum—the famous Madonna Lily—grows 3–6 ft. high, and has ivory-white sweet-scented blossoms 3–4 in. across, ten to thirty in a truss on finely grown plants, but more often half a dozen. They appear naturally in the open air in June, but that is too late for the commercial grower, who wants to be first in the market to secure the best prices to pay him for his outlay and trouble. He pays 16s. to 20s. per 100 for his bulbs, and proceeds to put three of them into a 6-in. (32) pot, in good loamy soil early in the autumn. The stock is covered with a few inches of soil, and root action soon commences. The plants are then brought into a warm greenhouse, and the increased temperature causes more rapid growth, so that the flowers may be had in March, April, and May, if required. Each bulb or plant produces on an average about six saleable flowers—some more, some less—and they fetch anything from 1s. to 3s. per dozen in the market. The blooms are taken off singly and packed three or four dozen in a shallow box with tissue paper, care being taken to pick off the swinging anthers, so that the pollen shall not tarnish the glistening purity of the petals. If not forced too severely the bulbs may afterwards be planted out about 6 in. deep in well drained garden soil, and after a period of one or two years' rest, will be fit for gentle forcing again, that is if the plants are not destroyed in the meantime by the terrible lily disease. This attacks the leaves in autumn and winter, and if not checked soon cripples the entire plant. The simplest remedy is to syringe the foliage with boiling water in which a little soft soap has been dissolved, or a little liver of sulphur (1 oz. to 4 gal. of water). The liquid must be applied forcibly with a fine-sprayed syringe or sprayer, and the boiling water will not injure the foliage in the least, but it will kill the fungus.

L. longiflorum.—This is the market grower's *Lilium par excellence*. It is grown by the hundreds of thousands in all parts of the kingdom from bulbs now chiefly imported in immense quantities from Japan, but formerly from the Bermuda Islands, until the fatal disease almost destroyed the industry in those islands. About seven millions or eight millions of bulbs of *L. longiflorum* are imported annually at present. The natural species grows 2–3 ft. high in China and Japan, has lance-shaped leaves, and bears from 6–12 large tubular bell-shaped pure-white flowers on top of the stems. There are many varieties, such as *giganteum*, *Harrisi*, *Wilsoni*, *eximeum*, *Takesima*, &c., the bulbs of which cost from 36s. to 80s. per 100 (more or less) wholesale, according to size, condition, &c. By means of forcing and retarding it is now possible to have *Lilium longiflorum* in blossom for twelve months in the year. While forcing eats up a good deal of the profits in coal and coke, retarding also cuts into the returns, because rent must be paid for storage to refrigerator companies—usually 1d. per cubic foot space per month, or from 60s. to 80s. per 100 cub. ft. per annum by special arrangement. Some firms, like Messrs. Rochford & Sons, of Turnford, have their own refrigerating apparatus, which, of course, enables them to keep back or place on the market blooms as required. The photograph shows cut stems of retarded *L. longiflorum* in bud (in the centre), and *L. speciosum*



open and in bud in tubs of water. The flowers of *L. longiflorum* are packed for the Paris and other markets in the bud state, so that they may arrive in just the right condition. When it is desired to force *L. longiflorum* three or four bulbs are put in a well-drained 8-in. pot, the soil used being a good turfy loam with some leaf mould, or well-rotted manure. Although the plants are to be had in bloom all the year round, the great trade in them is done at Easter and Christmas time. They are cut with stems as long as possible, and packed firmly in long shallow boxes, some growers sending almost 20,000 blooms to market in one week. (See plate.)

L. speciosum (fig. 285).—This fine Japanese Lilium is—next to *L. longiflorum*—the most popular with market growers, who still know it well



Fig. 285.—*Lilium speciosum*

under the name of *lanceifolium*. It grows from 3–5 ft. high, and has several varieties—some being deep red and rose spotted with carmine purple, others being white and without spots. The variety called *rubrum*, having white flowers suffused and heavily spotted with crimson, is one of the best red ones; while *album Kratzeri* is one of the purest and best whites. The bulbs are placed in pots, and the plants are grown in the same way as *L. longiflorum*. The flowers are sold on the long zigzag stems, or separately packed in shallow boxes. The white variety is in great demand with florists for wreath and bouquet work, and has succeeded in almost driving out the flowers of *Eucharis grandiflora*, at one time greatly prized for this business. Other greenhouse Liliums are *Browni*, *nepalense*, and *sulphureum*, which are grown in fair quantities at times.

In growing these Liliums under glass the grower has to guard against

attacks of Greenfly, which often infest the unopened buds and cripple them. This pest is best kept down by vaporizing, or by syringing the plants with nicotine, quassia, and soft-soap emulsions.

Lobelia.—The Bedding Lobelia is a cultivated form of *L. Erinus*, a native of South Africa. It is grown in hundreds of thousands in small pots, pans, or shallow boxes each year, and is a very popular plant for the margins of borders or beds, and is also extensively used for carpet bedding and other floral designs on the ground. The plants are not quite hardy, and must therefore be protected in a greenhouse or warm frame during the winter months. They are easily raised from seeds, cuttings, or division. Seeds are sown in January or February on the surface of finely prepared gritty soil in shallow boxes or pans, the seedlings being afterwards pricked out about 1 in. apart in a similar compost. The tops are often used as cuttings, being about 1 in. long, and inserted in gritty soil. Specially fine varieties are usually propagated from cuttings to keep them true. In autumn the old stock plants are placed in 3-in. or 5-in. pots, and kept close to the glass during the winter months in a genial warmth. Early in the new year, when growth becomes more vigorous, cuttings are freely produced and inserted in the way mentioned. Cuttings may be inserted in autumn as well as spring, and seeds may also be sown at the same period; but more space must be provided for the young plants thus produced.

There are several varieties, mostly blue or purple, with a few white ones; the best being: *Barnard's Perpetual*, *Emperor William*, *Bluestone*, *Blue King*, *Crystal Palace*; *pumila*, *magnifica*, *azurea*, *Royal purple*, all blue or purple, with a more or less conspicuous white eye; *Mrs. Clibran*, violet purple, with a white eye; *Kathleen Mallard* is a good double-flowered variety that has attracted some attention of late years. Amongst the best white Lobelias are *Snowball*, *Mrs. Murphy*, *nivea*, *White Lady*, *White Pearl*, *White Gem*, and *White Perfection*, all dense and compact in habit. A compact variety called *Golden Queen* has golden leaves and rich dark-blue flowers.

Lobelia tenuoir is a greenhouse species about 1 ft. high, having cobalt-blue flowers with a white eye. It is suitable for pots or hanging baskets, and may be raised from seeds in the same way as the Bedding Lobelia.

Marguerites.—The Marguerite, or Paris Daisy, is a form of *Chrysanthemum* (or *Pyrethrum*) *frutescens*, and grows wild as a shrubby perennial in the Canary Islands. It may be raised from seeds sown in February and March in the same way as Petunias, but market growers greatly prefer to raise their stock from cuttings. There are now some millions of plants raised in this way every year, and they find an ever-ready sale, varying from 6s. to 18s. per dozen for plants in 5-in. pots, according to circumstances.

Cuttings are taken in early spring, and also in autumn, from stock plants which have been cut down to encourage a good crop of clean young shoots. Those rooted in spring are useful for early winter work, and those in autumn are largely used for summer bedding. Indeed, young autumn-struck plants are sold in great numbers to the trade early in the

year by growers who make a speciality of raising a stock for those who have not the convenience for doing so, and good sturdy little plants may be had for about 5s. to 8s. per hundred. The white variety is by far the most popular for market work, one reason, perhaps, being that it does not so easily fall a prey as the yellow-flowered variety to the Leaf-miner that tunnels in the leaves and utterly spoils the appearance of the plants.

Once well rooted in pots, pans, or boxes of gritty soil, Marguerites are potted up singly into 60's in a soil that is rather poor than rich, so as not to engender excessive stem growth at the expense of the flowers. The plants are pricked out two or three times during the period of growth, and are eventually shifted into 5-in. pots when large enough. During the summer months they are stood in the open air, and the most important as well as the most arduous work is to keep them watered thoroughly during the hot weather. Sometimes the plants require watering three and four times a day, and even then half the water applied is wasted in the sense that it does not wet the soil in the pots, but the ground on which they are standing.

For early flowers in winter, batches of plants are taken under glass, but before severe frosts come the whole crop must be placed in shelter. Houses with plenty of light, a free circulation of air, and a temperature not lower than 40° F. by night will suit Marguerites very well, and will keep them free from the leaf maggot. This pest surely appears if the temperature becomes too high, say up to 60° or 70° F., and will soon ruin a crop. To check it an eggcupful of paraffin or kerosene to 3 gal. of warm water and a little soft soap should be sprayed occasionally over the plants while the leaves are still green and healthy. Once, however, the maggot is between the two skins of the leaves, insecticides of any kind are useless, and the only remedy is to pick off the injured leaves by hand, and have them burned at once.

Besides the white- and yellow-flowered varieties with single flower heads there is now a beautiful double-flowered one called Mrs. F. Sander. This has pure-white flowers about 4 in. across, with a ring of strap-shaped florets surrounding a close bunch of quilled florets in the centre. It is a charming variety, and is excellent for cut-flower purposes. Flowers of the yellow Marguerite are imported in large quantities, and find a ready sale in April and May.

Mesembryanthemum (FIG MARIGOLD).—Out of some 300 species only a few are grown largely. The most popular is the variegated form of *M. cordifolium*, which has small heart-shaped leaves bordered with creamy white, and bears masses of bright rose-purple blossoms. It is largely grown for carpet bedding, and is sold in shallow boxes. Propagation is effected by cuttings from stock plants inserted in a gritty compost under glass from February to April.

Other species are *M. crystallinum* (the Ice Plant), *M. tricolor*, and *M. pomeridianum*, all annuals easily raised from seeds sown in heat in spring. The Ice Plant is so called owing to the large glittering crystal-

like granules which give the ovate wavy leaves a frosted appearance. *M. pomeridianum* has yellow flowers like those of Sweet Sultan, but they only open in the evening. *M. tricolor* has pink-, crimson-, and white-flowered varieties.

Musk (*Mimulus moschatus*).—This is not grown so largely for market now as in years gone by, although there are still a few of the older growers who continue to raise a stock year after year, either from freshly sown seeds or from pieces of the roots of old stock plants placed in 5-in. pots. Musk is easily grown in any good compost, and in a temperature of 60° to 70° F. in spring it soon makes fine bushy masses of softly woolly green leaves, and masses of highly musk-scented flowers. Hybrids between *M. luteus* and *M. cupreus* have been raised and are known under the name of *maculosus*, owing to the heavy spots or blotches of deep-purple brown on the yellow flowers. The variety called *Harrisoni* has long been popular as a market plant, and realizes from 3s. to 5s. per dozen pots in these days.



Fig. 286.—*Nerine curvifolia*

Nerine.—At present the trade done in Nerines is confined to bulb merchants and Channel Island growers, but there is a possibility that these plants may figure more prominently in the markets in the future. There are many species and varieties and hybrids known, but the one most likely to attract the trade grower is *N. Fothergilli*. This is a splendid variety of *N. curvifolia* (fig. 286), a South African bulbous plant having large trusses of glistening scarlet flowers, each about 2 in. across, borne on stems 18 in. high. The following cultural notes from *The Bulb Book* will be useful to those who contemplate growing Nerines for market.

“The Nerines are all natives of South Africa, and are generally grown in pots in cool greenhouses. They like a compost of sandy loam with a little peat or leaf mould, and flower better if

not given too much space. Indeed, several bulbs may be placed close together, and in this way, according to the size of the pot, a better floral display will be produced. A peculiarity about Nerines is that they vegetate

during the winter months; that is, the leaves are in a growing and assimilating condition, and finish their work about April or May. During this period of activity the plants should be kept on shelves in the greenhouse close to the glass, to secure as much light as possible; and the temperature at night should not fall below 50° F., certainly not below 45° F. Plenty of fresh air should be given on all favourable occasions to avoid a "stuffy" atmosphere. When the leaves have withered, the bulbs should be given a period of rest. This is one of the most important features in the cultivation of *Nerines*. It will benefit the plants during this resting period to place them in a dry sunny position, and no water whatever should be given. The flower spikes begin to appear in June, and from then onwards, till October and November, and in some cases even till January, a supply of blossom may be expected during the dullest months of the year.

"PROPAGATION.—*Nerines* are easily propagated by offsets from the older bulbs, detached after the flowers have faded. Seeds may be ripened in most cases, and if sown in gentle heat in spring will germinate readily in rich gritty soil. In about three years they will make flowering bulbs. The ease with which *Nerines* may be raised from seeds has naturally attracted the hybridist, and some very fine forms have been evolved."

***Nerium* Oleander.**—This handsome evergreen shrub is sold occasionally in a small state. It has narrow leaves and single- and double-flowered forms white, pink, or red in colour. Raised from cuttings in sandy loam, and gentle heat.

***Ophiopogon* Jaburan variegata.**—A pretty Japanese plant with narrow strap-like leaves longitudinally banded with creamy-white or yellow bands. At one time it was grown freely for market, and is still grown by several for its ornamental appearance. It is almost hardy, and grows in loamy soil, and may be increased by division. Other kinds are *japonica*, with a variegated form, and *spicata*, with broader leaves and lilac flowers.

Orchids.—A score of years ago any suggestion that Orchids might be worthy of consideration as subjects for the skill of the market grower would have been met with scorn. But the speed with which matters horticultural have advanced of late years has brought Orchids into line, and they cannot be overlooked in any work on commercial gardening. In these pages they have to be considered in a manner quite apart from that with which they are viewed by the amateur, or the Orchid grower in a private garden, or even the retail nurseryman.

Orchid blooms possess such a richness, grace, and exquisite beauty, that their use in the highest floral art is now a general practice. To the bridal or ball bouquet, to the choicest wreaths, harps, or other designs for funeral orders, and to the dinner-table decorations on special occasions Orchid flowers impart an air of nobility and rare elegance that no other flowers can supply, hence there is always a demand for them, no matter what the time of the year. Of course it is during the spring—the London season—that the demand is at its height, and, fortunately, the demand synchronizes with the period of the year when Orchid flowers are the

most plentiful. But in late autumn and in early winter there is also a fairly good demand, especially when all outdoor flowers have been cut down by frost, and also during the Christmas and New Year festivities.

Orchids display a wonderfully wide range of form, size, colour, and habit, consequently the flowers may advantageously be used for a great variety of purposes. The "man in the street" regards every flower that is curious in form, or ultra-beautiful in colouring, as an Orchid; he also looks upon the different kinds of Orchids much as an amateur Rosarian looks upon different varieties of Roses; and he has a profound belief that Orchids can only be cultivated in extreme heat, and by a grower whose skill borders upon wizardry. A grower for the cut-flower market knows better than this, and the only question for him is whether the cultivation of Orchids will pay him a trifle better than, say, Carnations or Chrysanthemums. Let us state at once that in our judgment there is no room for any great extension of Orchid culture on commercial lines for cut flowers, but we believe that in many cases where a grower has a regular and high-class clientèle he could grow a few kinds of Orchids with advantage and profit, provided he, or one of his employees, has a good practical knowledge of the cultural conditions necessary for them.

The comparatively cheap rate at which glasshouses can be built nowadays, the increasing economy of modern heating apparatus, and the fact that so many of the kinds of Orchids especially useful for the purpose under consideration do not need continuously extreme heat have all tended to reduce very materially the cost of Orchid culture, and thus make flower production more remunerative.

We do not forget that a considerable number of hybrid Orchids are of immense value for cut flowers, and some of these are now so plentiful and reasonable in price that they come within the bounds of practical politics, but, nevertheless, the majority of Orchids grown for the cut-flower trade are imported from their native lands, and offered for sale in bulk at different periods of the year, chiefly in the spring, at the auction sales held in London, Liverpool, Manchester, &c.

Purchase of these imported plants is the best and cheapest method of commencing Orchid cultivation, unless one is in the happy position of being able to import direct from someone who can be depended upon to send plants of good quality, both as regards vigour and strain. The question of "strain" may appear to have little bearing upon the subject when importations are concerned, as this phrase is commonly used in connection with races or varieties of plants and vegetables raised annually or biennially from seeds. But it does count for a great deal, as many know to their cost. For instance, *Cattleya labiata* and *Odontoglossum crispum* (fig. 287) are two Orchids most extensively grown, and yet some importations give a high percentage of plants that will never yield other than the weediest of flowers, while others will give a high percentage of flowers of fine form, and purity or richness of colour. These latter will secure the highest prices as cut flowers, and there is always a good market for any

plants of outstanding merit among growers who maintain private collections. On the other hand, the weedy-flowered plants will never produce fine blooms, however skilfully they may be cultivated, and their blooms sell at a reduced figure. Nor must it be forgotten that it costs just as much to grow a plant worth 1s. or less, as it does to grow one that may be worth 5s. or £50. From this it will be gathered that Orchid cultivation on the basis of importations is something of a speculation. And so it is. Under skilful management the crop can be made to pay, but it is the finely blotched *O. crispum*, and the pure-white or grandly coloured and well-formed *Cattleya labiata*, sold to a fancier, that will put the gilt edge on the profits.

All newly imported Orchids must be treated as convalescent. Any attempt to deal with them as though they were established plants will end in dismal failure, and consequent loss of time and money. Every plant must be carefully handled and closely examined; it must also be thoroughly cleaned and relieved of all dead and decaying matter. Lack of attention to these matters in the first instance has not seldom led to disaster, or, at least, to the need of a large amount of labour at a later stage to free the plants from insect pests. Clean pots, clean crocks, and an abundance of the latter used to secure ample drainage, are items of

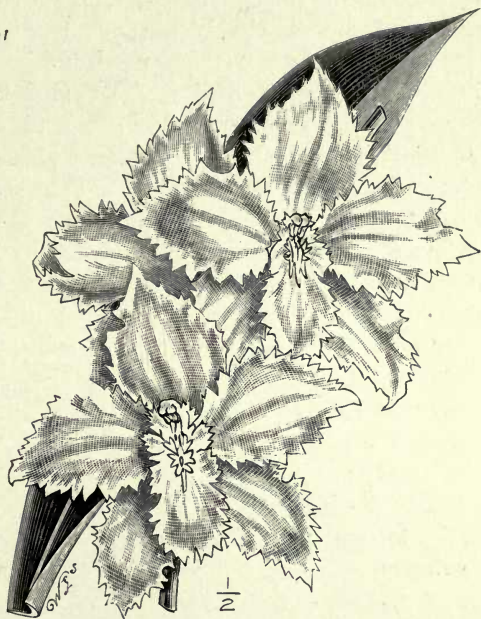


Fig. 287.—*Odontoglossum crispum* (white form)

the first importance, but the plants should be placed in a comfortable temperature for a short time before potting takes place, so that the pseudo-bulbs and leaves may plump up in the moist warm atmosphere, and new roots begin to form. During this convalescent stage fairly heavy shading must be afforded, reducing this somewhat as time proceeds, for it must be remembered that the plants have travelled long distances closely packed in dark cases. Fortunately, in most cases these imported Orchids have a large amount of reserve force stored up in their pseudo-bulbs, and if they are not over-potted or over-watered in these earlier stages of their new life they are not difficult to establish.

Comparatively few Orchids like direct bright sunshine, though they like good light. The houses should therefore be in a light open position, but well provided with blinds. Established *Cattleyas* and *Lælias* succeed under lighter and brighter conditions than do *Odontoglossums*, but all Orchids need practically all the good light we can afford them during the

winter months, in this country. Top ventilators should be provided, but their use for the admission of fresh air or the reduction of temperature must be severely limited. Bottom ventilators on both sides of the houses are a necessity, and there should be a number of them placed so that the outside air passing through them into the houses will be warmed by the hot-water pipes ere it reaches the plants. Top ventilation coupled with bottom ventilation tends to dry out the atmosphere quickly, and a dry atmosphere is not conducive to the best results. Moisture-holding material, such as clean cinders or gravel, on the stages is essential, and if the plants can be raised above this material on a light open trellis staging so much the better.

Practically all Orchids need far less moisture, both at the roots and in the atmosphere, during the period that follows immediately upon the completion of their growth for the season. In the case of Cattleyas, and especially Dendrobiums, the season of "rest" is very marked, and an abundance of water while the plants are comparatively inactive will quite spoil flower production and at the same time enfeeble the plants. *Cypripediums*, *Phalænopsis*, *Oncidium*s, *Odontoglossum*s, and *Cœlogynes* do not require so decided a season of rest, and with a few rare exceptions, that do not concern us here, they must not be "dried off", to use a technical phrase that is well understood among Orchid cultivators.

A word or two as to the potting material. There was a time when peat was the basis of all potting composts for Orchids, but it is wellnigh impossible now to obtain the best fibrous peat, such as formerly delighted the hearts of growers. Good substitutes for peat are found in *Polypodium* fibre, or the increasingly popular *Osmunda* fibre. These fibres are imported in large quantities, and, in combination with the large-headed sphagnum, form the great standby among orchidists. A small addition of oak or beech leaves, gathered clean at the time of fall, and stored under cover for a year, is made by many growers, and where the watering is done with great care this addition encourages root action and increases the vigour of the growths. An excess of leaves, however, tends to the production of large but not substantial flowers; therefore this must be guarded against, because anything that detracts from the lasting properties of the blooms reduces their value in the market.

Pure air and good light are of the utmost importance in Orchid culture, and we have only to observe how splendidly Orchids grow in districts far removed from towns and factory districts, and then inspect collections in the immediate neighbourhood of a great town or city, to discover how environment influences the plants. Further, the work of sponging the plants and cleaning the roof glass in districts where the atmosphere is laden with impurities is very considerable, and would materially increase the cost of production without any compensating advantage. Orchid flowers for the great cut-flower markets are produced chiefly in such pleasant places as Haywards Heath and Balcombe, Broxbourne, St. Albans, Cheltenham, the outlying suburbs of Liverpool and Manchester, &c.

The prices obtained for Orchid blooms vary greatly. For the "weedy" flowers already indicated the returns are low. *Odontoglossums* range from 2s. to 6s. per dozen, and *Cattleyas* from 6s. to 18s. or even 24s. per dozen. *Dendrobiums* may realize from 1s. to 3s. per dozen, and *Calogyne cristata* sell at a somewhat similar rate. Large sprays of golden *Oncidium*s will range from 1s. to 5s. each, according to their size, quality, and colouring, while a fine spike of a *Phalenopsis* may bring anything from 3s. to 20s. The *Cypripedium*s are most in evidence during the dull months of the year, and as they are particularly long-lived when cut they are extremely popular for personal wear or general decorations.

The common *Cypripedium insigne* is sometimes offered in the City of London, by the street flower girls, at one penny each, consequently the return to the grower must in such cases have been a very small one indeed. However, when choice flowers are sold at such a low rate it usually happens that the market has been overloaded with them for once in a way; well-grown flowers should realize from 1s. to 3s. or 4s. per dozen, according to their size and variety. Referring again to *Cypripedium insigne*, it must be remembered that this Orchid is an easy one to manage, and in an ordinary season it does not require artificial heat for three or four of the warmer months of the year. A plant in an 8-in. pot should produce a dozen flowers, and a fair-sized house will hold a very large number of such plants, and so it is not difficult to estimate fairly well the number of blooms a given area devoted to their culture will produce.



Fig. 288.—*Dendrobium nobile*

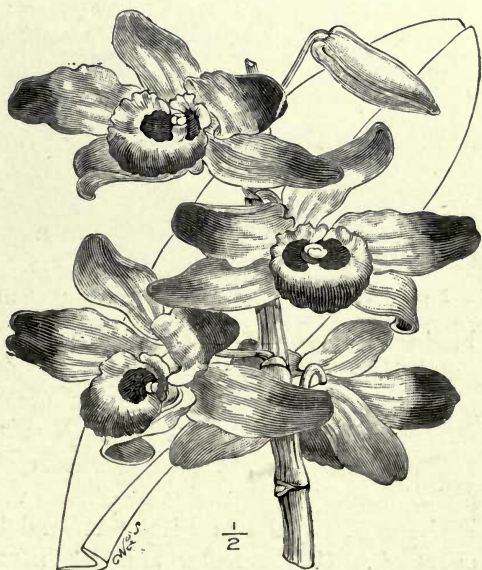


Fig. 289.—*Dendrobium Wardianum*

Orchid flowers are sent to market in shallow boxes, and wrapped lightly in an abundance of tissue paper. Cotton wool is sometimes used to line the box, but every care must be taken to keep this from direct contact with the flowers, because if it adheres to the blooms—as it very often will, owing to the slight stickiness of the flower stems—it is objectionable and will militate against their sale, or at any rate reduce their value.

For cut flowers the Orchids most grown are as follows: *Cattleya aurea*, *C. Bowringiana*, *C. labiata*, *C. Schröderæ*, *C. Trianae*, *C. Mossiæ*, *C. Mendelli*, *C. Harrisoniæ*, and *C. Warscewiczii*. *Dendrobium aureum*, *D. Ainsworthi*, *D. nobile* (fig. 288), *D. crassinode*, *D. Falconeri*, *D. splendidissimum*, *D. Phalænopsis Schröderianum*, and *D. Wardianum* (fig. 289). *Celogyne cristata* and its lovely white form are “cool” Orchids of great value for cut flowers, but, alas! they do not travel well, and their blooms are so easily damaged if at all roughly handled, every slight bruise soon turning to a brown or blackish mark of disfigurement.

Among Odontoglossums the favourites are *O. crispum*, *O. cirrhosum*, *O. Harryanum*, *O. grande*, *O. Pescatorei*, *O. triumphans*, *O. Rossi majus*, and *O. Wilckeanum*, with such hybrids as *O. ardentissimum*, *O. Lambeauianum*, *O. Adrianae*, *O. amabile*, and *O. excellens*. Of the

Phalænopsis the most useful are *P. Rimestadtiana*, *P. Schilleriana*, *P. amabilis* (or *P. grandiflora*, fig. 290), and *P. Stuartiana*. The most notable of Oncidiums for the purpose under consideration are *O. flexuosum*, *O. varicosum* *Rogersii*, *O. bracteatum*, *O. crispum*, *O. concolor*, *O. sarcodes*, *O. Marshallianum*, *O. macranthum*, and *O. incurvum*. Cymbidiums must not be forgotten, as their flowers are very lasting when cut; *C. Lowianum* is the most popular and its green and brown flowers are known to almost everyone. *C. eburneum* and the newer *C. insigne* (*Sanderæ*) are also valuable.

The list may fittingly conclude with a selection of Cypripediums or Lady's Slipper Orchids. The difficulty is to know where to stop, because so many species, varieties, and hybrids are now so largely grown. How-

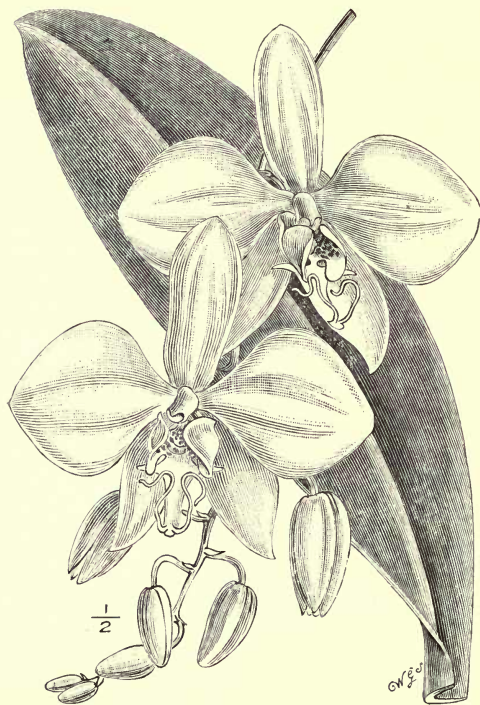


Fig. 290.—*Phalænopsis amabilis*

ever, there can be little mistake about *C. insigne*, *C. Lceanum*, *C. Charlesworthii*, *C. Fairrieanum*, *C. Spicerianum*, *C. villosum*, *C. barbatum*, *C. Lawrenceanum*, *C. niveum*, and *C. callosum*. [C. H. C.]

Palms.—Of the four or five hundred species of Palms known in cultivation but very few have attracted the attention of the market grower. Although nearly all kinds are ornamental in foliage and graceful in habit, most of them lack the main features required by commercial gardeners—namely, rapidity of growth and easiness of propagation. Some ornamental Palms, although grown easily and quickly enough, are still too scarce to make it worth while devoting a large space to their culture. Others, again, may be obtainable in quantity, but unfortunately it takes so long to bring them to saleable size that the grower cannot afford to keep the space they would occupy so long under one particular crop. The market grower, therefore, looking at Palm growing purely from a commercial standpoint, confines himself to those species which will sell readily at a reasonable price, and can be produced in a comparatively short time.

The trade in Palm seeds is enormous, and millions are imported annually into the British Islands alone of the most popular kinds, such as the Kentias, *Cocos Weddelliana*, *C. flexuosa*, *Livistona chinensis*, *Seaforthia elegans*, *Corypha australis*, &c. On the Continent also a very extensive trade is done in Palms.

All market Palms, and indeed most Palms, are raised from imported seeds. These are generally sown, in shallow pots or pans or wooden boxes, in rich sandy soil of a loamy nature, and are placed in warm moist houses to ensure rapid germination. Before sowing, some growers steep the seeds in tanks of water, and it is often noticed that large numbers of seeds float on the surface of the water. These are considered to be old seeds, that have lost a good deal of substance and perhaps vitality, whilst those that sink to the bottom are heavier and fresher, and more likely to give better germinating results.

When the seedlings have made two or three leaves they are potted up singly into 3-in. pots in a rich gritty loam with a little leaf mould or well-decayed manure added. They are still grown on in heat and moisture, and in due course many find their way into 3-in. or 5-in. pots.



Fig. 291.—*Cocos Weddelliana*

Many, however, remain in 2½-in. pots, and in this size thousands of *Cocos Weddelliana* (fig. 291) are sold annually. To secure a better effect, and a readier sale, some kinds, such as *Areca lutescens*, are placed two in a 5-in. or 6-in. pot, in the same way that many Ferns are, thus securing at once a more bushy and well-furnished appearance.

Although for actual market work Palms sell best in 2½-in., 3-in., 5-in., and 6-in. pots, there is also a good trade done in large specimens grown in big pots and large wooden tubs. Plants ranging from 10 ft. to 30 ft. high, and even more, are grown by some of the big marketmen like Messrs. Rochford, and these are sold for furnishing purposes to the great florists in London and the provinces. Such plants are often required for big Society weddings, public dinners, and public functions of all kinds, and there is no other class of plants that can give the requisite air of opulence and luxury to such proceedings. While the price of Palms in small pots may be as low as 6s. per dozen, the large decorative specimens will realize anything from £5 to £50 apiece, according to circumstances. It must be remembered, however, that large plants do not sell rapidly at high prices, and that they require large and costly glass structures to keep them in a healthy condition, to which must be added the cost of fuel, labour, &c.

Amongst the most saleable Palms the following may be mentioned:—

ARECA.—There are several species, but *A. (Chrysalidocarpus) lutescens*, from Madagascar, is the most popular. It has slender yellowish-green stems and gracefully pinnate leaves. Once established it will thrive in a greenhouse temperature. Two or three plants are often grown together. *A. sapida*, from New Zealand, and *A. Baueri*, from Norfolk Island, are elegant *Kentia*-like species, both of which, however, really belong to a genus called "*Rhopalostylis*".

COCOS.—Of the thirty species known, only two are favoured for market, viz. *C. Weddelliana* and *C. plumosa*. The first-named is grown in thousands from seeds, and has been a favourite for many years owing to its light and graceful appearance, and to the fact that pretty plants can be raised for sale in about eighteen months. Plants in 3-in. pots sell for 6s. to 12s. a dozen, while larger specimens fetch from 2s. 6d. to 10s. 6d. each. Fully grown specimens rarely exceed 6 ft. in height. *Cocos plumosa* has made its way as a market and a furnishing Palm of late years owing to its graceful feathery appearance. It grows much larger than *C. Weddelliana*.

GEONOMA GRACILIS.—This small-growing Palm from Costa Rica is grown in fairly large quantities by some, but it is considered too slow in growth and therefore too costly by others. It resembles *Cocos Weddelliana* in appearance, but has somewhat larger and broader leaves. It flourishes under the same conditions as the *Cocos*, and, although it takes longer to grow, realizes only the same price. *Geonomas*, however, last much longer than *Cocos*, and will stand rougher usage.

KENTIA.—The two species, *Belmoreana* and *Fosteriana*, both from Lord Howe's Island, are more correctly known to botanists under the

name of "Howea". Thirty years ago they were unknown to market-men, but now they are grown in hundreds of thousands. They are both graceful Palms, with arching pinnate deep-shining green leaves, and it requires some little care to distinguish one from the other. Of all Palms perhaps they will stand the roughest treatment, and if hardened off before sale will live for many years in the bleakest and draughtiest of rooms or halls. Plants in 3-in. pots sell for 4s. to 6s. per dozen, while those in 5-in. pots realize 12s. to 24s. per dozen; and larger specimens will fetch much higher prices.

Amongst the true Kentias mention should be made of *K. Sanderiana* (fig. 292), a very graceful Palm from New Guinea, and *K. elegantissima*, from the same place. The illustration shows the general appearance of *K. Sanderiana*.

LICUALA GRANDIS is a fine Palm with a slender stem and broad roundish plaited glossy-green leaves. It is better known in the trade under the name of *Pritchardia*. Large specimens are used occasionally for furnishing. *L. elegans* is a dwarf species of tufted habit.



Fig. 292.—*Kentia Sanderiana*

LIVISTONA.—The Palms popularly known under the names of "Corypha" and "Latania" really belong to this genus. The well-known Fan Palm, *L. chinensis* (which is still better known in commercial circles as *Latania borbonica*), is an excellent plant, easily grown, and even hardier in every way than the Kentias. It has spiny stems to its fan-shaped leaves, and is very ornamental in appearance. Plants in 5-in. pots sell for 12s. to 18s. per dozen, higher prices being realized for larger specimens.

L. australis—still well known as *Corypha australis*—is a very hardy Palm, smaller in every way than *L. chinensis*. It is easily grown, and two plants are often put together in the same pot.

It may be mentioned here that the true *Latantias* are ornamental Palms from Mauritius. They have tall non-spiny stems, palmate leathery leaves, which in a young state are attractively bordered and lined with red or yellow. The best-known kinds are *Commersoni* (or *rubra*), *Loddigesi*, and *Verschaffelti* (or *aurea*).

PHOENIX.—The Date Palm (*P. dactylifera*) belongs to this genus, but is not a marketable plant. The most valuable species for growers are *P. Roebeleni* and *P. rupicola*, both graceful plants with rigid midribs to the loose and arching leaflets. They are grown like the Kentias, and realize from 2s. 6d. to 21s. each, according to size and particular circumstances.

RHAPIS.—Both *R. humilis* and *R. flabelliformis*, both natives of China, are useful Palms for decorative purposes, although they do not figure largely as market plants, except occasionally as small specimens. They are easily grown in a greenhouse temperature, and will stand a long time under adverse conditions.

SEAFORTHIA ELEGANS.—A very graceful and useful Australian Palm, now known more correctly as *Archontophoenix Cunninghamii*. The arching leaves remind one of the Howeas (*Kentias*), but are not so glossy or so deep in colour. Associated with this species is *Archontophoenix* (or *Ptychosperma*) *Alexandrae*, which is similar in appearance, but may be distinguished



Fig. 293.—*Linospadix Petrickiana*

by the blue-green under surface of the leaves. The trade in these species has declined considerably since the introduction of the Howeas (*Kentias*).

Other Palms met with in botanical and private collections and sparingly stocked by some nurserymen are the following: *Acanthophoenix* (*Areca*) *crinita* and *A. rubra*, from Mauritius and Bourbon; very charming in a young state, and requiring abundance of heat and moisture. *Brahea edulis*, from Mexico; *Calamus ciliaris*, from Tropical Asia; *Caryota*, various species; *Chamædorea*, several species; *Chamærops humilis*, the only Palm indigenous to Europe, and quite hardy in the mildest parts of the British Islands. *C. Fortunei* (or *Trachycarpus excelsa*) is a hardier plant, popularly known as the "Chusan Palm". *Demonorops*, several species, ornamental in appearance when young, and having spiny stems. *Euterpe edulis* and *E. oleracea* are the Cabbage Palms of South America, and have pinnate gracefully arching leaves, and are highly ornamental in the young state, but will not stand very much rough usage. *Hyophorbe* (*Areca*) *Verschaffeltii* is a stove Palm, ornamental in appearance owing to its deep-green gracefully arching leaves with yellowish nerves. *Linospadix Micholitzii* and *L. Petrickiana* (fig. 293) are two graceful Palms of

recent introduction from New Guinea. They are dwarf and tufted in habit, and the young leaves are of a rich brown purple. They require stove treatment. *Martinezia caryotefolia* is a distinct stove Palm, while the species of *Penanga* are remarkable for their mottled leaves. *Pritchardia aurea* is met with occasionally as a big specimen for furnishing or decorative work, and is recognized by its large yellowish leaves. *Ptychoraphis augusta*, *P. Sanderiana*, and *P. singaporensis* are elegant Malayan Palms with pinnate leaves resembling those of *Cocos Weddelliana* and *Geonoma gracilis*. They are charming in the young state, and should prove an excellent investment for the market grower. When hardened off they will stand well in rooms, halls, &c. All the species of *Thrinax* are graceful in a young state, especially *T. Morrisi* and *T. Pumilio*. *Verschaffeltia splendida* is a striking Palm from Mauritius with large two-lobed leaves. *Wallichia densiflora* and *W. caryotoides* are dwarf, tufted Tropical Palms; and *Washingtonia filifera* (often called a *Pritchardia*) is a fine Californian plant with bright-green palmate leaves.

Pandanus (SCREW PINE).—There are many species, but the one most favoured by market growers is *P. Veitchi*, a lovely plant from the South Sea Islands, with elegant glossy-green leaves striped with white. It flourishes in a rich loamy soil, with a little peat or leaf mould and sand added. Young growing plants enjoy plenty of warmth and moisture, and the night temperature should not sink much below 70° F. The plants should be syringed daily to keep them free from scale insects; and during bright sunshine it is necessary to shade if the variegation is to be had pure. When established, a lower temperature is advisable. Nice plants in 5-in. pots realize from 2s. 6d. each upwards. Market growers might also consider *P. Sanderi* from a commercial standpoint. It is a fine plant, with creamy-yellow stripes on the leaves. *P. javanicus variegatus* is another silvery and green form, very pretty when young.

Panicum variegatum (*Oplismenus Burmanni*).—A charming Grass, from Tropical Asia, with tufts of trailing stems and leaves striped with pink and white. *P. plicatum* is much more compact in growth, and has long lance-shaped leaves strongly veined and resembling some Palms in appearance. There is a nice variegated form of it. These plants grow in sandy loam and leaf soil, and are increased by division.

Pelargonium.—Under this title there are four distinct kinds of plants grown for market, viz.: (1) ZONAL PELARGONIUMS (including green-leaved, silver-leaved, bronze-leaved, and tricolor-leaved varieties); (2) IVY-LEAVED PELARGONIUMS; (3) SHOW AND FANCY PELARGONIUMS; and (4) OAK-LEAVED OR SWEET-SCENTED PELARGONIUMS. These are all popularly known under the name of GERANIUM, a genus which has already been dealt with at p. 47.

ZONAL PELARGONIUMS.—These constitute the most important group, and millions of plants are raised and sold annually by market growers, to say nothing of the hundreds of thousands that are also raised in private-garden establishments. The different varieties have originated from *Pelar-*

gonium zonale and *P. inquinans*, both natives of South Africa. The first-named has roundish smooth or softly downy leaves, with a distinct dark zone or band, which gave rise to the popular name of Zonal. The flowers vary from red, scarlet, and crimson to pure white. *P. inquinans* has more kidney-shaped leaves not so deeply cut or crenated on the margins as *P. zonale*, and the flowers vary from intense scarlet to rose and white. During the past two hundred years and more gardeners have been improving the progeny of these two species until one would scarcely imagine that the large circular broad-petalled varieties had anything to do with the species that had narrow-petalled irregular flowers such as are produced by the "Oak-leaf" section.

Zonal Pelargoniums of all sections are easily propagated from cuttings taken almost at any time of the year so long as they are not too young and sappy. Spring and autumn, however, are the two chief periods for taking cuttings. These vary from 1-3 in. in length, and are cut beneath a joint, and trimmed of unnecessary leaves and stipules. They are then inserted round the edges of 5-in. or 6-in. pots in gritty soil, or three cuttings may be put in a 3-in. pot filled with the compost, the cuttings in all cases being dibbled in. Some growers use a little silver sand on the top of the soil, but the vast majority do not trouble about this detail. Besides pots, shallow wooden boxes or trays known as cutting boxes, and measuring 15 in. long by 9 in. wide and 2 in. deep, and costing from 8s. to 10s. per 100 or per gross, are extensively used. Each box is filled up with gritty soil, pressed down firmly with the fingers, and will hold two dozen cuttings comfortably. These boxes are very useful for placing on shelves over the pipes in many small greenhouses where space is a consideration, and where pots would take up much more room. From January to March and April hundreds of thousands of Zonal Pelargoniums are propagated in this way, and in a temperature of 65° to 70° F. they root readily. When well established they are moved into 3-in. pots and perhaps later on into 5-in. pots, according to circumstances. Cuttings are also struck readily in hotbeds in spring, the young plants being potted on as quickly as possible. During August cuttings root quickly in the open air in any good garden soil, and the old plants are frequently planted out in May or June to produce a supply for this purpose. Autumn-struck cuttings produce bigger plants in the spring, and are usually sold in 5-in. pots. Cuttings are often taken from them up to February and March. This makes the older plants—which during the winter are stood pot to pot—more dwarf and bushy, with the natural result that more space must be given them about the end of March or early April. Unless grown specially for cut flower, no flower trusses are allowed to develop until about six weeks before the sales usually begin. They are pinched out, thus throwing all the vigour of the plants into growth. To hasten the development of fine specimens in a short time, a little weak liquid manure is given from time to time, and perhaps a little special manure is worked in about the middle of March or early April. If a little basic slag is mixed with the soil at

the last potting it will help the plants considerably also. From this time onwards as little fire heat as possible is given—perhaps only at night to prevent damping—and on all genial days as much air as possible is given. This hardens the plants off by the middle or end of May, when the bedding-out season may be said to commence in earnest. The plants are sold either in 3-in. (60's) or 5-in. (48's) pots, fetching from 2s. to 2s. 6d. and 4s. to 5s. per dozen respectively; and in cutting boxes, containing two dozen "rooted" cuttings, fetching 1s. 6d. to 2s. 6d. per box.

Apart from the sale of plants, Zonal Pelargoniums are also grown for the production of cut flowers in winter, spring, and summer. This trade developed many years ago, when there were fewer flowers to be had and prices were better. The single varieties even in those days sold, but the flowers soon dropped, and it was not until the idea of "gumming" blossoms arose that an extensive trade was done. It is said that the gumming of single "geranium" blooms was first practised by a costermonger, who found that when he stuck the petals on, as it were, he did a more flourishing trade. The double-flowered varieties need no gumming. To secure plenty of bloom in winter, cuttings should be struck in spring, and the plants potted up and grown on out-of-doors during the summer months. The flower trusses are pinched out when they appear, and not till September or October according to circumstances are they allowed to develop. Not only must plenty of light be given to winter-blooming Zonals, but the atmosphere must be kept fairly dry, and the temperature should not fall below 65° F. at night, while 70° to 75° will not be too much during the day.

The following are some of the best market Zonal Pelargoniums at present: *Scarlet and crimson flowered*: Paul Crampel, Vesuvius, West Brighton Gem, Corsair, George Potter, Admiral Togo, Henry Jacoby (rich crimson), John Gibbons, Paul Farrer (brilliant orange scarlet), King Edward VII, Jacqueri, &c.

The first-named—"Paul Crampel"—seems to have taken the world by storm. It has practically displaced the old favourite "Vesuvius", and has reduced the immense popularity held for so many years by the finest of all crimsons—"Henry Jacoby". "West Brighton Gem", with its whitish and green-striped stems, sturdy bushy habit, and fine scarlet flowers, still holds its own pretty well.

White-flowered: Snowdrop, White Vesuvius, Snowdon, Albion, White Princess, White Perfection, Queen of the Whites, International, Queen of the Belgians.

Pink-flowered: Master Christine, Mrs. Turner, Mrs. French, Constance, E. F. Crocker, Mrs. H. Cannell, Mrs. Brown Potter, Henry Compton, Coomber's Pink.

Silver-leaved: Flower of Spring, Day Break, Mrs. Parker, The Bride, Dandy, Little Dot, Silver Queen, the best silver; Lucrece, Mrs. Lever, &c.

Green-and-gold-leaved: Crystal Palace Gem, Cloth of Gold. A one-time old favourite—"Happy Thought"—seems to have vanished from market circles.

Bronze-and-gold-leaved: The Czar, Her Majesty, Zulu, Marshal MacMahon, Black Douglas, Golden Harry Hieover, Prince Arthur, Bronze Queen, Bronze Beauty.

Golden Tricolors: Miss Pollock, Master Harry Cox (salmon flowers), Masterpiece (scarlet flowers), Sophia Dumaresque, Lady Cullum, Peter Grieve, Mrs. Turner, Prince of Wales, &c.

Silver Tricolors: Charming Bride, Dolly Varden, Lass of Lowrie, Mrs. John Clutton, Mrs. Laing, Princess Beatrice, &c.

One of the most popular single-flowered salmon-pink varieties is Lady Chesterfield—strong, sturdy habit, and fine in blossom. Surprise, another salmon-pink short stocky grower. A newer variety is Mrs. Robert Cannell, even better than Lady Chesterfield in colour, habit, and size of truss. Salmon Paul Crampel is another new variety.

Doubles: F. V. Raspail, scarlet, splendid for cut; Hermione (nearly always written and pronounced “Hermoine”), white; King of Denmark, rosy salmon; White Abbey, white; Henry Jacoby, deep crimson; Gustav Emich, scarlet; La Cygne, white.

IVY-LEAVED PELARGONIUMS.—These have arisen from *P. peltatum* or *P. hederæfolium*, a South African species with five-angled or lobed ivy-like shining-green leathery leaves and white or red flowers. Numerous varieties—single and double—have been raised, but, unlike the bushy Zonals, they are all straggling and long-stemmed in habit. This makes them valuable for drooping over window boxes, for pegging down as carpet plants in beds and borders, or for baskets hanging from arches, porticoes, &c. They are raised from cuttings in the same way as the Zonals, but require perhaps a little more heat and more grit in the soil. The plants also are much more subject to attacks of greenfly, which cripple the leaves and spoil the plants. They must therefore be syringed with nicotine, soft-soap, and quassia emulsions, or the houses must be fumigated or vaporized from time to time. A fungoid disease, probably *Botrytis cinerea*, attacks the plants sometimes and destroys the foliage and blossom. The only remedy is to burn the affected plants, or to prevent the spread of the disease by syringing with liver of sulphur (1 oz. to 3 or 4 gal. of water). Of late years hybrids have been raised between the Ivy-leaved and the Zonal sections, and some of them will probably become market favourites.

The following varieties are grown largely: Souvenir de Charles Turner, deep rose, double; Madame Crousse, pink, double, with a brilliant scarlet form; Prince of Wales, cerise; Achievement, soft salmon pink; Galilee, beautiful clear rose; H. Cannell, rosy scarlet; Madame Thibaut, deep pink; Giacomelli, pale lilac; Mrs. Hawley, cerise; Queen of Balkong, deep scarlet; Willie, bright scarlet.

SHOW, DECORATIVE, AND FANCY PELARGONIUMS.—The “Show” and “Decorative” Pelargoniums have been evolved from *P. cucullatum* and *P. grandiflorum*, and the “Fancy” kinds have probably had a similar origin. The garden varieties of the Show and Decorative section have large circular flowers, the two upper petals of which are blotched with

a distinct colour. Thirty or forty years ago these were very popular plants, but they have gradually given way to the more vigorous Zonals. The "Fancy" Pelargoniums differ chiefly in having the margins of the petals crisped or wavy, and are marked in various ways. The leaves are less hairy, moderately lobed, and with sharper teeth than the Zonal section. Both sections are less easy to grow than other garden Pelargoniums, and are much more liable to damp off or rot during the winter; they are also very subject to attacks of aphides, and must be kept clean in the way recommended for the Ivy-leaved section. The plants are propagated from well-ripened cuttings of non-flowering shoots during July and August in a gritty loam in the same way as the Zonal varieties. The young plants, however, must be kept in a warm atmosphere during the winter and in the maximum amount of light. A little, but not too much, moisture is necessary, otherwise they are apt to rot off. In spring the plants are transferred to 5-in. or 6-in. pots, and when started well into growth the tops are pinched out to induce a bushy habit. Weak liquid manure or soot water applied occasionally is very beneficial, and keeps the foliage of a deep healthy green colour. Years ago large numbers of these Show and Fancy Pelargoniums were brought to Covent Garden from the neighbourhood of Tottenham and Edmonton, Mr. Beckwith of the former place being the largest grower in the kingdom at the time (fig. 294).

OAK-LEAF AND SCENTED PELARGONIUMS.—There are many species of Pelargoniums having deliciously scented foliage. Some, however, are rare and never likely to be grown in large quantities, while others are somewhat fastidious. The only species that is still grown, but not nearly so much as formerly, is *P. quercifolium*—the sweet-scented Oak-leaf Geranium.

It is as easily grown as any Zonal, and has deeply lobed and divided leaves, sweetly scented, the flowers being small, purple or rose, with narrow petals. Besides the plants a limited trade is done in the foliage, the leaves being made up in bunches and sold for backing coat flowers, &c. The plants may be grown for years



Fig. 294.—Show Pelargoniums

and will attain large proportions. Market growers, however, prefer them in 5-in. or 6-in. pots, and often cut the old ones hard back in the new year to make plenty of new growth during the season.

Petunia.—The garden Petunias have originated from two South American species, namely *P. nyctaginiflora* and *P. violacea*, the first hybrid between them having flowered in 1837. Since then vast strides have been made in the evolution of the Petunia by crossing and inter-crossing, and, instead of having only single flowers about 2 in. across

and of one shade of colour, there are now single and double forms with flowers 4 to 6 in. across, and with shades of colour varying from the purest white through rose, pink, purple, magenta, crimson, and intermediate shades to the deepest violet—colours relieved in many forms with streaks, blotches, and bands of totally distinct shades. Instead of flowers with a simple outline there are now Petunias in which the petals of the corolla are beautifully cut, fringed, crimped, and curled in various ways (fig. 295).

Petunias are really perennial plants, but it is found more convenient to treat them as half-hardy annuals. They



Fig. 295.—Petunias (single and double)

seed freely, and many choice strains exist. The dust-like seeds are sown thinly on the surface of a nicely prepared sandy compost in February or March in a temperature of 60° to 65° F. at night, and are kept in a fairly moist condition. When large enough to handle easily the seedlings are pricked out about 1 in. apart in shallow boxes or pans of light soil. In April they will be ready for moving singly into 3-in. pots, or fine specimens may be put into 5-in. pots for special purposes. In many cases, however, the plants are simply transferred to shallow boxes, and are sold in the young stage in this state. Pot plants usually have the tip of the main shoot pricked out to induce bushiness, and by the end of May and in June the trade is in full swing for bedding out.

Generally speaking, the weakly looking seedlings amongst the single *Petunias* are those which often produce the finest shades of colour later on; and amongst the doubles the weaker seedlings usually become the most gorgeous and beautifully frilled, &c., when in blossom.

When particularly fine strains are required true to name, they are raised from cuttings. These are taken from the non-flowering side shoots in August, and when inserted in sandy soil and well watered are plunged in a brisk bottom heat of 70° to 75° F. They root readily, and are afterwards transferred to somewhat cooler places and potted up singly. During the winter months they are grown as near the glass as possible in a warm greenhouse, and in February and March the tops may be taken off and rooted as in August.

Plumbago capensis.—A well-known South African climbing shrub having pale-blue flowers in the type, and also a white variety. Flourishes in sandy loam and is increased from cuttings.

Poinsettia (Euphorbia) pulcherrima.—For many years this brilliant-looking Mexican Spurge-*wort* has been a favourite in the market during the winter months, not because of the beauty of its flowers, which are small and yellow, but because of the whorls of scarlet leaves or bracts at the top of the stems. There is a variety having white instead of scarlet bracts, but it is not likely to be a market plant. There is also a so-called double variety (*plenissima*), in which clusters of smaller brightly coloured bracts are borne within the larger ones, and, as they colour in succession, the decorative season is somewhat prolonged (fig. 296).

Plants for market are grown as short as possible, usually in 5-in. or 6-in. pots. They are raised each year from cuttings taken between May and June to the beginning of August from stock plants which are cut down earlier in the year (March), and are started into growth in a fairly warm greenhouse. The cuttings are from 4 to 5 in. in length, and some growers only cut them halfway through at first, and then leave them for a day or two before severing completely from the parent plant. In this way the poisonous milky juice is not wasted so much, and the cut-



Fig. 296.—*Poinsettia pulcherrima*

Commercial Gardening

tings root more readily afterwards. The cuttings are inserted in sandy soil and plunged in a hotbed as near the glass as possible, the temperature being from 75° to 80° F. They are shaded for a few days until rooted, but afterwards are given plenty of light to prevent them from becoming leggy—a drawback to be guarded against at all costs.

When the cuttings are rooted and slightly hardened off, they are placed singly in 5-in. or 6-in. pots in a compost of 2 parts turfy loam, 1 part leaf mould or old cow manure, and 1 part silver sand. The temperature is kept up to about 70° F. at night. The plants are shaded from strong sunshine at first until again established, but otherwise the heads of the plants are kept as close to the glass as possible without actually touching it.

During the summer months they may be placed in a frame, but the lights are always kept on except when watering, as the sunlight through the glass helps the plants considerably to remain dwarf and to develop more highly coloured bracts. As they increase in height it may be necessary to raise the frame by putting bricks under it at each corner. In this way ventilation will be secured from the bottom. Of course, low span-roofed houses, well ventilated and exposed to the sun, will be more useful for growing Poinsettias than frames, and no fire heat will be needed during the summer months. About the end of September, however, the temperature must be kept up to about 50° F. during the night, with a rise of 5 degrees or a little more during the day. If the temperature is much higher than this the bracts will not retain their brilliant colouring for such a long period.

In the event of plants becoming too tall during the summer months—and Poinsettias are naturally inclined to lankiness—the stems may be “ringed” within 6 or 7 in. from the top about the end of August or early in September. If cut about halfway through at this point, and left until a callus has been formed by the coagulated sap, at the end of ten days or a fortnight, the shoots may then be severed completely and placed singly in 3-in. pots in a mixture half loam and sand. They are kept in a close frame for about three weeks, when they will be well rooted, after which they are gradually exposed to more air. The plants are then potted again into 5-in. or 6-in. pots, according to vigour, and are placed close to the glass.

Of course during the whole period of growth watering is attended to carefully, and fully established and maturing plants may be treated to occasional doses of weak liquid manure. The average price is from 9s. to 18s. per dozen.

Primula obconica.—Notwithstanding the reputation this species has of causing eczema, it is still largely grown for market and in private establishments. It is one of the most free-flowering Primulas in cultivation, and flourishes in any good compost of loam, leaf soil, and sand. Of late years great improvements have taken place in it, and the flowers are now quite as big as a half-crown piece, and are produced in fine

trusses on stems 6 to 9 in. high, well above the large wrinkled leaves. The colour of the flowers has undergone great change as the result of selection and intercrossing, and there are now pure-white, pink, mauve, heliotrope, purple, rose, and intermediate shades to be met with. To have a crop of plants in bloom during the winter, the seeds should be sown in March, April, and May to secure a good succession.

Primula sinensis.—From this has originated the florist's Chinese Primula, which for many years has been a favourite with market growers. Fig. 297 shows the loose and graceful habit of the typical species, which of late years has again become fashionable in private gardens. The dwarf florists' varieties, however, are preferred for market work, as they are easier to transport and do not require so much care in packing. The red- and white-flowered varieties are perhaps most popular, but there are all shades of colour (except yellow), among them being scarlet, crimson, mauve, lavender, pink, and intermediate shades.

Seeds of the Chinese Primula (in which, of course, a good trade is done by specialists) are sown in March, April, and May in order to secure a succession of bloom from early to late in the season—from October onwards. Some care is taken in properly draining the pots, pans, or boxes in which the seeds are to be sown, and a



Fig. 297.—*Primula sinensis*

compost of 3 parts loam, 1 part sand, and 1 part well-rotted manure or leaf mould is used, although some growers have loam and leaf mould in about equal proportions. The soil is watered before the seeds are sown. Thin sowing is the rule, and the seeds are just covered with some fine gritty mould. They germinate irregularly in a temperature varying between 50° F. at night and 70° F. by day. When large enough to handle easily the seedlings are pricked off about 1 in. apart into pots, pans, or boxes in a similar compost, and are placed in a somewhat shaded part of the greenhouse until again established. The seedlings are next moved singly into 3-in. pots, but specially large plants may be placed at once in 5-in. pots. In all cases the plants are potted so that the soil comes well up to the collar. During growth, attention is given to careful watering, and a sprinkling overhead two or three times a day is usual in genial weather when the plants are in the early stages of growth. During the summer

months—from June till the end of August—the plants will do well in a cold frame, or in a greenhouse with a northern aspect. Abundance of fresh air and diffused light must be available during this period to keep the plants sturdy, but they must be protected from very strong sunshine as well as cold biting winds and an excess of moisture. Besides the single-flowered varieties a pure-white double-flowered one is also grown, and was

once very popular for cut flowers with florists, and realized from 12s. to 20s. per dozen bunches years ago; but those days are long past, and prices have dropped considerably. For pot plants the average market price now varies from 3s. to 6s. per dozen.

Rhododendrons, Greenhouse. — The



Fig. 298.—*Rhododendron*—Multicolor hybrid

trade in these plants is practically confined to a few nurserymen, and many fine hybrids have been raised by crossing species from the Malayan and Javanese regions with *R. multicolor* from Sumatra (fig. 298). The plants are nearly always in bloom, and vary in colour from pure white to pink, rose, salmon, crimson, scarlet, &c. They are grown in sandy peat in a warm greenhouse temperature, and like plenty of moisture during the summer months, and also frequent syringings, to keep them free from Thrips and Mealy Bug. Propagation is by cuttings of the half-ripened shoots in a close frame.

Saintpaulia ionantha.—This curious little African Gesnerad is gradually attracting attention owing to its compact habit with small fleshy Gloxinia-like leaves, and deep- or light-



Fig. 299.—*Saintpaulia ionantha*

blue Violet-like flowers, which have given it the name of the "Usambara Violet". There are a few forms, the best being *grandiflora*. They are all easily raised from seeds sown in heat, and treated in the same way as Gloxinias (fig. 299).

Salvia (SAGE).—Out of some 450 species of Sage there are only two or three species largely grown for decorative work. *S. splendens* is a Brazilian plant, 2–3 ft. high, remarkable for its brilliant scarlet flowers, which are produced in abundance. There are several fine varieties of it, easily raised from cuttings in sandy soil in spring, and plunged in a hotbed till rooted; or many of them may be raised from seeds sown at the same period. Some of the best forms are *grandiflora*, *Glory of Stuttgart*, and *Glory of Zurich*—the latter being perhaps the best and most popular for bedding-out work. It is a magnificent plant of bushy habit, and produces its flaming scarlet blossoms in profusion during the summer months. A new yellow-flowered variety has recently appeared, and has yet to make its way. Other scarlet-flowered Sages are *coccinea*, *elegans*, *fulgens*, *gesneræfolia*, *Heeri*, *involucrata* *Bethelli*, *rutilans*, &c., all of which require the same treatment as *S. splendens*.

Amongst the best blue-flowered Salvias are *S. azurea*, 3–6 ft. high, and *S. patens*, 2–3 ft. high, both very deep in colour, but with flowers more loosely borne than in the scarlet forms.

Amongst hardy Salvias, *S. argentea*, with large downy white leaves and branching trusses of white flowers, is noteworthy.

Sanchezia nobilis.—An ornamental foliage plant, from tropical America, with large deep-green leaves having the mid-rib and main veins bright yellow. Flowers tubular, yellow. Requires loamy soil, and is raised from cuttings.

Solanum.—Of the many species known, *S. capsicastrum*, from Brazil, is the market grower's plant *par excellence*. Before and after Christmas it figures conspicuously on the grower's stands, the brilliant scarlet berries as large as cherries being particularly attractive amongst the deep-green leaves. There are numerous seedling variations. Growers, as a rule, prefer to raise their plants from cuttings obtained from old cut-down plants that have been started into growth. Several cuttings are inserted in gritty soil in spring and plunged in bottom heat. They soon root, and are then potted up singly in small pots. When well established the tips of the shoots are pinched cut to induce a bushy habit. They are next moved into 5-in. or 6-in. pots, being potted firmly in a mixture of good loam with a little sand and leaf mould. During the summer months they are grown in frames or airy houses. This causes the pollen to float about and come in contact with the stigmas, thus ensuring a good crop of berries. The plants are syringed daily until the flowers appear, and this keeps the foliage clean and encourages growth, and also keeps Red Spider in check. About September the marble-like berries are green and conspicuous, and from this onwards a little weak liquid manure is often given to keep the foliage deep green in colour, and to increase the size

and colour of the fruits. If Greenfly should appear, the houses or pits must be fumigated or vaporized. Good bushy plants, well berried, will realize from 9s. to 12s. per dozen in 5-in. pots.

Other *Solanums* grown or met with frequently are *S. Melongena*, the "Egg Plant", an annual grown for greenhouse decoration in Britain and for its edible fruits on the Continent. The ordinary variety has white egg-like fruits, but there are others having long violet or purple fruits.

S. jasminoides is a beautiful climbing plant, hardy in the mildest parts of the kingdom, and remarkable for its drooping clusters of pure-white

flowers during the summer months. It is raised from cuttings of the half-ripened shoots under glass.

S. Wendlandi, from Costa Rica, is a lovely climbing plant, easily grown in a cool or slightly warm greenhouse. One or two nurserymen, however, of late years have succeeded in producing splendid bushy plants in 5-in. pots, smothered in lilac-purple flowers each about $1\frac{1}{2}$ in. across. The plants are easily raised from cuttings, and may be had in flower during the winter or late autumn months. It is worth the attention of market growers (fig. 300).

Several other kinds of *Solanum* remarkable for their ornamental foliage are now largely used for bedding out during the

summer months for sub-tropical effect. Amongst the best for this purpose are *S. guineense*, *marginatum*, *quercifolium*, *quitoense*, *robustum*, *Warscewiczii*—all of which are easily raised from seeds sown in heat in spring.

What is known as the "Wonderberry" in America is identical with our native weed, *S. nigrum*, the black berries of which are poisonous in Britain, while they are said to be edible and nutritious in America.

***Sparmannia africana*.**—An ornamental shrub with hairy leaves and trusses of white flowers. Small plants are best for greenhouse work. Grown in loam and raised from cuttings.

***Spiræa japonica*.**—This plant is really not a *Spiræa* at all, but nothing will make the market grower call it anything else. Its proper name is *Hoteia japonica*. Hundreds of thousands of plants are grown under glass for market every year from imported roots, although the plant is perfectly hardy and flowers well in the open air during the summer months. The



Fig. 300.—*Solanum Wendlandii*



LILACS FORCED INTO BLOOM IN THE DARK



(31)

Photo. Chas. L. Clarke

HOTEIA (SPIRÆA) JAPONICA IN FLOWER, WITH ASPARAGUS SPRENGERI AND
NEPHROLEPIS OVERHEAD

plants are highly appreciated, not only because they are cheap and easily grown, but on account of their gracefully divided leaves, superb bushy habit, and erect pyramidal trusses of pure-white blossoms which stand well above the brilliant glossy-green foliage. Besides *S. japonica* another plant, called *S. astilboides*, and its variety *floribunda* are extensively grown. Of late years new varieties, called "Peach Blossom" and "Queen Alexandra", with soft-pink or rose-tinted flowers, have made their appearance. They are charming plants, but they will probably never dislodge the white varieties from public favour.

When the roots are imported from Holland and France, about September, they are chopped up and made to fit into 5-in. or 6-in. pots. Any old soil available is worked in around the roots, and in most cases no attention whatever is given to drainage. Very little soil indeed is used, as the roots practically fill the pots themselves. The plants are then placed in beds of ashes outside a greenhouse, or sunk in soil in any convenient place, the tops being a few inches beneath the surface. Plants may be had in bloom at Christmas-time, and right on during the season till Whitsuntide, after which the prices usually go down with a rush, and the plants are snapped up for the costermonger trade. Early plants require a temperature of 75° to 80° F., a very humid atmosphere, and abundance of moisture at the root. After Christmas less fire heat will suffice, but the plants will always require plenty of moisture, and as the spring advances watering becomes one of the most strenuous occupations. The plants grow with such extraordinary freedom that they require to be spaced out frequently to allow for proper development. It is by no means unusual to see a plant in a 5-in. pot occupying a space 2 ft. square, and yet sometimes such lovely specimens will only realize 3s. per dozen in market, and even less. At one time—thirty years ago—*Spiraea japonica* fetched as much as 42s. per dozen when brought in early in the season, but the modern grower must be content with from 6s. to 12s. per dozen for good stuff.

In these days, however, the grower is helped considerably by the retarding process. The roots of *Spiraea japonica* may be stored in a refrigerator for several months, and there may remain without harm when there is a glut in the market. When taken out, the plants can be had in bloom in from five to eight weeks' time, according to the season and the heat supplied.

Stephanotis floribunda.—A strong-growing woody climber from Madagascar, having thickish elliptic leaves, and masses of highly fragrant waxy-white tubular flowers. Almost every grower of flowers for market or florist work at one time grew *Stephanotis*, and notwithstanding the severe competition from other beautiful white flowers of recent years, the blooms of *Stephanotis* still find a market. The plants are easily grown in a compost of loam and peat, and may be increased by layers or by cuttings of the half-ripened shoots. A stove temperature suits the plants best when growing freely, and abundance of water must be given at the root,

and also by syringing the foliage. When in flower a lower temperature—about 65° F.—by night is sufficient. Scale and Mealy Bug are the worst enemies of the *Stephanotis*, but may be kept in check by syringing with insecticides occasionally and by fumigation or vaporizing. In winter, when the plants are dormant, it is sometimes necessary to untie the shoots and cut out the older wood. The plants may then be thoroughly cleansed if needed. One plant in the course of time will cover an enormous amount of space, and in some places the tips of the shoots are nearly 100 ft. from the main stem. The flowers which appear in early summer are bunched up in half-dozens for market, and are still popular for wreaths, crosses, wedding, and other bouquets.

Streptocarpus.—The beautiful garden forms (fig. 301) have arisen by the crossing and intercrossing of such species as *S. Dunni*, *S. Rexi*, and



Fig. 301.—*Streptocarpus*

S. parviflora, the two first hybrids being known as *Kewensis* (*S. Dunni* × *S. Rexi*) and *Watsoni* (*S. Dunni* × *S. parviflora*), in commemoration of the Royal Gardens, Kew, where they were raised by Mr. W. Watson, the present curator, and general editor of *The Gardeners' Assistant*. Both these hybrids were figured in *The Gardeners' Chronicle*, August, 1887, pp. 214, 247. The original Kew hybrids were taken in hand, and have since been crossed with other species like *S. parviflorus*, *S. Fannini*, and *S. Wendlandi*. The flowers of the garden forms display great variation in colour, the individual blooms being more or

less drooping, tubular, and beautifully striped. By sowing seeds in February and March on gritty soil, and in a temperature of 70° to 75° F., plants can be obtained to flower by the following August, and continue to bloom during the autumn and winter months. The treatment given to *Gloxinias* will suit *Streptocarpaceus* perfectly. The coloured Plate will give an idea of the beauty of the flowers.

Streptosolen Jamesoni.—A climbing Colombian plant with large heads of orange-scarlet flowers. Often used for bedding out in summer. It is increased from cuttings and flourishes in loam.

Strobilanthes.—The best species is *Dyerianus*, remarkable in a young state for the beautiful appearance of its large broadly lance-shaped leaves which are washed with a mixture of crimson, steel blue, and purple. It

is easily raised from cuttings and during the summer months makes a fine bedding plant. *S. isophyllus* is an old favourite with pale-blue tubular flowers.

Swainsona coronillifolia (*galegifolia*).—The typical form of this Australian Leguminous climber has long racemes of bright-red flowers, but the white-flowered form is more valuable commercially. It is useful for cutting and also for bedding out in summer. It likes a compost of peat and loam, and is raised by cuttings of the half-ripened shoots.

Tecoma.—The yellow-flowered *T. Smithi* (fig. 302), and the orange-scarlet *T. capensis* are climbing shrubs usually raised from cuttings in sandy loam and peat.

Trachelium cœruleum.—This bushy South European perennial, although nearly hardy, is usually grown as a cool greenhouse pot plant. It has ovate, deeply-toothed leaves, and masses of small violet-blue flowers. There is a white-flowered variety also. Plants are raised from cuttings or seeds, and thrive in sandy loam.

Tradescantia zebrina (*Zebrina pendula*).—A well-known Mexican plant with fleshy trailing stems and oval-oblong leaves, purple beneath, but striped with greenish-white above. There is a fine form having the leaves striped with yellowish-white and suffused with carmine rose, and another striped with bright yellow. There is also one having wholly green leaves hardier than the coloured forms. All kinds are easily raised from cuttings, and may be grown in the greenhouse or stove. They are useful for edgings and hanging baskets, indoor rookeries, &c., and grow in any light soil.

Tuberose (*Polianthes tuberosa*).—Tuberose were grown more extensively a few years ago than they are at the present day. They were very popular with florists, and thousands of bulbs were imported annually for forcing during the winter and early spring months, different batches being used to keep up a succession. The double-flowered variety known as "The Pearl" is the only one favoured by market growers, owing to its size and purity of colour. The bulbs are usually placed in 5-in. pots in sandy loam, with a little leaf soil or well-rotted manure. At first they are kept cool to get root action established, but afterwards they may be placed in a house with a night temperature of 65° to 75° F., to bring them quickly



Fig. 302.—*Tecoma Smithi*

into bloom. The pots are often plunged in hotbeds up to the rim, and in this way there is a regular supply of moisture at the roots. In the spring months less artificial heat is required, as the sun gains in power, and during the summer months the plants can be grown in a cool house or even in the open air. The blooms are picked off the stems and tied up in dozens in little pieces of thin paper, and thus sold in market. The florists wire the blooms and use them in all kinds of ways for bouquets, wreaths, and other emblems. After strong forcing the bulbs are thrown away, and a fresh supply is imported from France or Holland in the autumn.

Vallota purpurea (SCARBOROUGH LILY).—A fine South African greenhouse bulbous plant with evergreen strap-shaped leaves, and bright scarlet tubular flowers in summer topping a fleshy stem 2 to 3 ft. high. It likes sandy loam and leaf soil, and may be increased by seeds and offsets.

Verbena.—The garden Verbena has been evolved from several species, and is largely used for the decoration of flower beds and borders during the summer months. There are many varieties and strains, including Henderson's mammoth, the Italian striped, the Auricula-eyed, &c. They are raised from seeds sown in heat, and grown on rapidly and afterwards hardened off. Special varieties, however, are raised from cuttings, and amongst these may be mentioned Miss Willmott, one of the best rose-red forms; Ball of Fire; Lord Brooke; Crimson King; Purple King; Princess of Wales, deep blue; Queen of Whites, &c.—all excellent for bedding out.

V. venosa, a fine Brazilian plant, 1-2 ft. high, with bluish-violet or lilac flowers, is a good bedding plant, and is best raised from cuttings. The old stock plants of all Verbenas are kept near the glass and in gentle warmth in winter.

Wigandia caracasana (*macrophylla*).—A fine foliage plant about 10 ft. high from the mountains of New Granada, with large elliptic heart-shaped leaves covered with softish hairs and of a ruddy brown tint. It is chiefly useful for subtropical gardening in summer, and may be grown in any ordinary good garden soil. Seeds are sown in heat in February or March, and soon germinate. The young plants are pricked out into boxes or small pots, and are sold in May and June with other bedding stuff after being hardened off.

SECTION XIV

Ferns

§ I. THE LIFE-HISTORY OF FERNS

The life-cycle of flowering plants, which may be shortly stated as seed, plant, flower, and seed again, is simple enough to be popularly understood; but that of the Ferns is so much more complicated, and evidenced on such a microscopic scale, as to be mainly unknown even to those who grow Ferns or appreciate their beauty. In the first place, the Fern is differentiated from the flowering plant by bearing neither obvious flowers nor obvious seeds, although, as we shall presently see, microscopic equivalents of these are really produced in the course of the events which precede the appearance of a second generation of young Ferns. Instead of a



Fig. 303.—Sporangium of *Cystopteris*

a, Annulus; *b*, broader cells of same where bursting takes place (magnified).

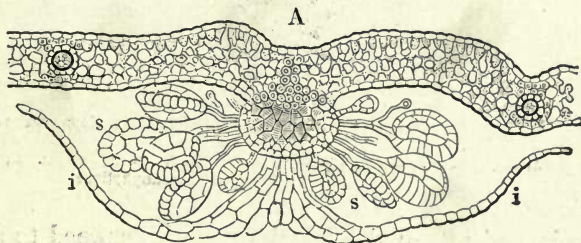


Fig. 304.—Section of Leaf and Sorus of *Nephrodium Filix-mas*

s, Sporangia; *i*, Indusium (magnified).

seed proper, which is always the result of fertilization brought about by the conjunction of reproductive cells existing in the pollen grain as the male, and in the embryo seed as the female, the Fern produces on its fronds an enormous number of asexual spores, microscopically minute bodies which consist only of a reproductive cell protected by a husk or shell. These spores are contained in tiny capsules or pods (sporangia) (fig. 303), and their minuteness may be conceived when it is stated that even these pods are only definable as such under a good lens, though they contain, as a rule, several scores of spores apiece. These capsules in their turn are collected into groups (fig. 304), and it is the method of these groupings and arrangements

generally which has enabled the botanists to classify and divide Ferns into a large number of distinct genera, determined by such arrangements, while these genera are again divided into species, which all have the same form of fructification, but vary in make, habit, and other characters on more or less definite lines. In the vast majority of cases the spores are arranged on the backs of the fronds in isolated dots or roundish heaps (Polypodium) (fig. 305 A), in definite lines along the veins within the margin (Asplenium) (fig. 305 D), in continuous or interrupted lines along the margin (Pteris, fig. 305 E, Scolopendrium, Adiantum, fig. 305 F), in continuous even layers covering the surface (Platyserium); while in some genera, such as Osmunda,

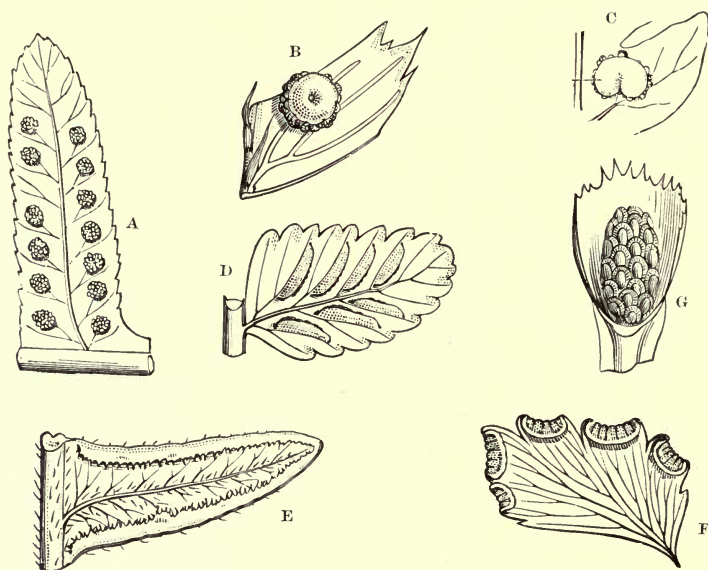


Fig. 305.—Showing Pinnules and Sori of various genera of Ferns

A, Polypodium. B, Aspidium. C, Nephrodium. D, Asplenium. E, Pteris. F, Adiantum.
G, Sorus of Hymenophyllum

Anemia, and others, the fructification is confined to definite portions of the frond, or as in *Struthiopteris* and *Onoclea* to entirely specialized fronds, a more or less clustered form being adopted at the expense of the leafy development. Apart from these and many other types of arrangement, characterizing different genera, the groups of sporangia are differentiated by the presence or absence of a protecting cover called the *indusium* (fig. 304 i), and the particular form which this cover assumes. Thus we have three native genera both characterized by bearing the sori or spore heaps in a round isolated form, viz. *Polypodium*, *Polystichum*, and *Nephrodium* (*Lastrea*). The *Polypodium*, of which we may take one common species, *P. vulgare*, or the exotic *P. glaucum* as types, has these heaps entirely destitute of a cover, as, of course, have all its generic relatives. The other two, on the other hand, have distinct semi-transparent scale-like coverings or indusia, but are differentiated by those of *Polystichum*

being quite round and attached to the centre of the heap by an almost imperceptible stalk, while in *Nephrodium*, although similarly attached, the cover is definitely kidney-shaped, the attachment being at the deep indentation. *Blechnum* and *Lomaria*, two very similar genera, bearing the spores on upright contracted fronds springing from a rosette of leafy ones, are often confused even by the botanists who have determined the difference, which is that in *Lomaria* the lines of spore heaps are purely marginal, with the margin turned backward to act as indusium, while in *Blechnum* the heaps or lines are only near the margin, which is unaltered, a distinct

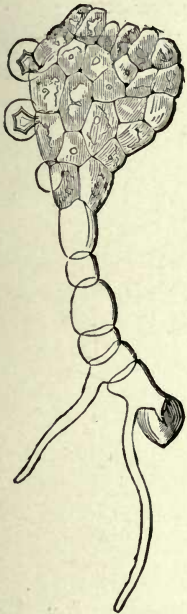


Fig. 306.—A Young Prothallus arising from a Spore

and independent indusium arising between it and the spore heaps. From what we have stated, it is clear that a little study devoted to the forms in which the spores are borne is of great assistance in determining to what species the plant concerned belongs, apart from the general appearance, which may mislead.

Having thus dealt with the spore, or rather the spore heap, as a discriminating feature for Fern identification, we may now go a step further and consider how this unfertilized one-celled simple body can effect its task of engendering a new generation, involving as this does something equivalent to flowers and the two sexual interacting elements which flowers produce prior to the evolution of a fertilized seed capable of yielding a young plant.

A seed, as we know, enjoys the advantage of containing not merely a fertilized germ but also a store of nourishment with which the

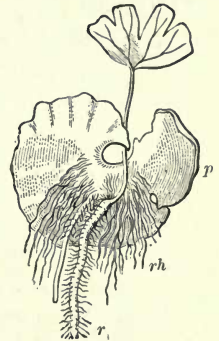


Fig. 307.—Young Fern Plant
p, Prothallium; rh, rhizoid;
r, root

mother plant had endowed it after the fertilization was effected in order to give it a start in life. The spore possesses no such advantage; it is only endowed with sufficient vitality to swell under congenial conditions of warmth and moisture, and, bursting the husk, to protrude a self-engendered root-like cell which attaches itself to the soil; and by virtue of the nourishment obtained therefrom and from the air through the chlorophyll, which even at this early stage it contains, it slowly forms, first a short chain of cells (fig. 306) and then by lateral multiplication as well, it builds up a heart-shaped dark-green growth (fig. 307) about the size of a herring scale, which is firmly rooted to the soil by innumerable root hairs or rhizoids, mainly springing from the first-formed part of the "prothallus", as this body is termed. Viewed from above, the prothallus looks simple enough, and resembles anything but a Fern, a fact which rendered the origin of young Ferns a profound mystery until so recent a date as 1846, when Count Suminski discovered the final stage in the normal

life-history of the Fern, and the mystery was one no longer. Detaching one of these scales from the soil, reversing it, and studying it under a good lens, we find it to be a very wonderful structure indeed. Dotted about profusely among the tuft of root hairs we see a number of roundish pimple-like growths (fig. 308 *an*); and farther up, close to the indentation of the heart-shaped prothallus, we shall see a little close-set cluster of teat-like bodies (fig. 308 *ar*). Beneath these we may see that the body of the prothallus is considerably thickened, and dissection would show that at the base of each of these teat-like bodies a round incipient seed was embedded. Assuming, then, as we shall be justified in doing, that these teat-like bodies represent the stigmas in flowering plants, and deducing therefrom that the round pimples should represent the male or pollen element, we see at once that the simple one-celled spore shed from the

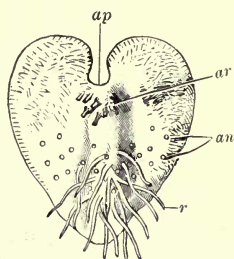


Fig. 308.—Underside of Prothallus of Fern

ap, Apex; *r*, rhizoids; *an* antheridia; *ar*, archegonia (magnified).

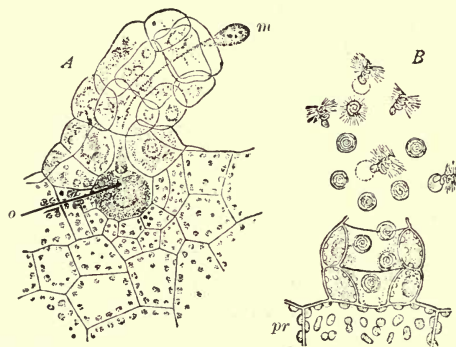


Fig. 309.—A, Archegonium ejecting mucilage (*m*); *o*, oosphere. B, Antheridium ejecting antherozoids. *pr*, Prothallium (highly magnified).

parent fern has managed to construct a very complete apparatus for the performance of the reproductive function. The only remaining question is: How is it done? If, while the prothallus is so reversed, we flood it with tepid water, we may, if we are very fortunate, see some of the round pimple-like bodies (antheridia) burst, and from them will be sent a considerable number of extremely minute ciliated bodies (fig. 309B) (antherozoids), which commence to swim actively about in the water (normally existing in the form of a dewdrop), actually steering themselves definitely towards the teat-like bodies (archegonia) the special cells or oospores at the bases of which it is their province to fertilize, since each contains, as does a pollen grain, the male potency essential thereto. Arrived at the archegonia, they find their way to the incipient seeds (oospores) at the base of the hollow they have traversed, and from that moment the fern "seed" begins to develop by cellular multiplication. Ere long a little frond rises through the indented parts of the heart-shaped prothallus (fig. 307), a little root (*r*) descends, the fleshy prothallus acting for a time as foster mother, and in this way the young Fern is fairly launched in life after, as we have seen, a very wonderful pre-natal career.

The life-history of a Fern may thus be summarized. Fern, spore, prothallus, antheridia, archegonia, incipient seed, Fern again. This, however, is the normal course; but Nature in her infinite variety has contrived to bring about the same results—i.e. Fern from Fern—by numerous short cuts. Thus in the familiar Ferns, *Asplenium proliferum* and *Nephrolepis exaltata*, we see the shortest cuts of all, since the parent Fern bears in the first case a veritable multitude of youngsters on its fronds, youngsters so precocious that they often bear another generation of their own before being detached; and, in the second case, by a multitude of stoloniferous runners on Strawberry lines, by which it can be propagated *ad libitum*. These represent the types of numerous Ferns of bulbiferous or stoloniferous habit in which a new generation is produced by direct outgrowth of the parent, and to this class belong those Ferns which produce lateral offsets. These proliferous forms, however, relate to the adult Fern, and do not affect the prothallic life-cycle already described, and which has also been varied in every conceivable way. Some years subsequent to Suminski's elucidation of the normal cycle, Professor Farlow, in the United States, demonstrated that with some Ferns (amongst them our *Lastrea pseudo-mas cristata*) a non-sexual bud was generated on the prothallus and produced the parental type, the antheridia and archegonia and incipient seed being thus eliminated, an ordinary bud being produced instead. The writer then discovered on a form of Lady Fern (*Athyrium filix-fœmina*, var. *clarissima*, Jones) that certain excrescences yearly produced on its frond backs, and which had persistently refused to yield plants by means of the sporeheaps which they were assumed to consist of, were really capable, when layered, of developing prothalli direct without the intervention of the spore, these prothalli proving to be perfect by the production of numerous characteristic plants. This implied the elimination of the spore and spore cases, which Professor Bower eventually found were partially aborted at an early stage, the prothalli eventually growing from the remaining cells. This was termed "apospory", or spore elision. Mr. G. B. Wollaston immediately followed with an example of a *Polystichum* (*P. angulare*, var. *pulcherrimum*), in which the extreme tips of the subdivisions of the fronds grew out into prothalli which produced plants, though of imperfect character. This cuts out the sporeheap altogether, and has been termed "apical apospory" and the first found form "soral apospory" to differentiate them. Since then this phenomenon has been found in several other species, mostly of British Ferns and in varietal forms. Dr. Lang's experiments with spores of abnormal varieties went even the length of demonstrating that a Fern might possibly be perpetuated indefinitely without getting beyond the "prothallium" stage, since he found spores produced on the prothallus itself; and if these had produced offspring (which they failed to do), and inherited the retrogressive character, this would have constituted a reversion to a very low type of vegetation indeed, resembling the Marchantias or Liverworts.

To the Fern-cultivator a good grip of the particulars we have given of

the career of the embryo Fern will be of value when we come to consider a little later on their propagation by the several means at command. Meanwhile, however, as part and parcel of the life-history of the Fern, we think it well to say a few words on those of the past. In the first place, the Ferns, as spore bearers, belong to that great family of plants, similarly characterized, which in the far distant Carboniferous Age formed those forests of immense area which in their fossil state now represent the coal seams upon which so vital a portion of Britain's—and indeed the world's—prosperity is founded. The mind utterly fails to conceive the immensity of time which lies between that period or periods and the present time. Thousands of feet of superincumbent formations have been piled upon them, each one a page in the history of the world, involving perhaps changes from high land to deep ocean, and, in any case, immensely long periods for their deposition, to say nothing of the intervening pages which have been deleted by erosion. Nevertheless, it is a very remarkable fact that the Ferns of even that far-distant date strongly resemble those of the present, though it is presumably a fact that in the same period practically all the wonderful diversity of fruit and flower has been evolved from plants which at that time were really Ferns or their allies, or had only commenced to be evolved with the true floral character. One fact which had probably contributed to this practical standstill in Fern development is the microscopical character of their inflorescence, which has prevented them from benefiting by that interaction of the insect world which has played so powerful a rôle in floral evolution. In this connection it is a curious fact that all through the Ferns, whether assuming the size of a magnificent Palm, as in *Dicksonia*, *Cyathea*, &c., or that of a minute grass tuft, as *Asplenium septentrionale*, not only are the spores equally microscopic, but the prothallus is practically indistinguishable, and the fertilization nominally is always self-effected, i.e. by the adjacent antherozoids of the same prothallus, a fact which throughout nature tends rather to degradation than upward evolution. Since Ferns have undoubtedly sprung from the seaweeds which formed the antecedent types of primary vegetation, and yet, as Ferns and allied plants, were so definitely developed in the Coal period, we are necessarily confronted with another inconceivably long period of time precedent even to that; a consideration, however, with which we need not burden our brains, as it is utterly beyond calculation.

Having studied Ferns in their incipient stages, and also in their past relations, we may now proceed to some practical considerations regarding culture and propagation. To the selective cultivator, and also to the commercial raiser of Ferns on a large scale, the raising from spores is practically the main mode. To the selective cultivator, for the reason that when sowing varietal forms there is always a chance of improved seedlings, or, if sowing diverse forms together, crosses of value may result, neither of which advantages attaches to propagation by division or bulbil, while the wholesale raiser obtains thereby a practically illimitable crop only con-

finer as regards numbers to the demand. In the trade quick-growing exotic Ferns are so rapidly raised in warm houses that the precautions necessary in the case of slow-growing hardy Ferns grown under cold conditions are usually ignored, sowings on non-sterilized soil topped with crushed flower pots being made on a large scale, so that a percentage of failures matters nothing. To the amateur, however, dealing with less favourable conditions, we recommend the following procedure. The spores are best sown as soon as ripe, say in July, not because they do not retain their vitality for years, but because they then germinate almost at once and obtain the full benefit of the growing season. If collected the previous season, sowing in March is advisable for the same reason. Sowings in late autumn are very apt to fail. Having obtained the spores, we take small pots or shallow pans, well drain them, and fill them nearly to the brim with good fern compost—2 parts loam, 2 parts leaf mould, and 1 part silver sand—rubbed fine and well pressed down, a few crumbs of loam being sprinkled on top. We then place a small piece of paper on the top, and upon this we pour boiling water until it runs out scalding hot at the bottom. This kills all worms, eggs, or germs, and gives the spores a fair field, which from their minuteness is very essential. Covering the pot with a piece of glass, we allow it to cool. The spores, even from a few heaps, will under a microscope prove to number hundreds or even thousands, and it is well to get this fact into one's mind, so that the sowing may be judiciously thin and somewhat in accordance with the sower's subsequent accommodation for the resulting plants. Naturally, too, a thin sowing, giving room from the first for the prothalli, is better than what may practically be equal to sowing a hundred Sweet Peas in a wine-glass. The pots being quite cool, the spores should be evenly distributed by gentle tapping of the paper, and the glass cover at once replaced. This replacement, it may be explained, is necessary, as other fern spores or inimical germs may be floating about, and it is well to exclude such as far as possible. The pots or pans may then be put in a shady, cool, but well-lighted place or Wardian case, and if they are small it is a good plan to embed as many as a large pan will hold in fresh coconut fibre, which, if kept moist, will ensure proper conditions in the embedded pots. These should never be watered overhead, but only in case of need by absorption from below. In this case a single pane of glass suffices. In a few weeks, according to the season and the species concerned, the little green prothalli above described will be seen first as glistening green specks, and eventually as full-sized heart-shaped scales perhaps $\frac{1}{4}$ in. across. These, if, due to too thick sowing, they are greatly crowded, may be safely pricked out in pill-sized patches, 1 in. apart, into larger pans, the soil being preferably again sterilized, though this is not so essential as in the first instance. In a few weeks more, if proper close conditions have been afforded, the first fronds (fig. 307) will be pushing up here, there, and yonder, after which it is only a question of pricking out and bringing on to adult size. If the prothalli hang fire in this respect, a gentle spraying

with warm water, or immersion of the pan in such until the water percolating from below just floods the prothalli, may bring about the desired alliances usually effected by means of a dewdrop, as above explained.

Where hybridization is desired to be effected, the two sorts of spores should be sown together on somewhat thicker lines, since cross fertilization can only take place naturally if the prothalli are crowded together. It is, however, beyond doubt that a flooding from below, as mentioned above, when the prothalli are about mature, may have the effect of transporting the fertilizing antherozoids from one prothallus to another and thus effecting a cross. Spores, however, as we have suggested above, do not all germinate with the same rapidity, and hence a sowing of a slow-growing species must be made at one time, and that of its more rapidly developing companion later on, to permit of simultaneous maturity. Some crosses are said to have been effected by severing prothalli of two kinds and bringing the two different halves in close contact, an idea which is quite feasible, as the prothallus is very tenacious of life, and will bear such an operation with impunity.

One point must be remembered in crossing or hybridizing, and that is, that it is practically impossible to determine what is a cross or a hybrid except by the clear appearance of the two parental characters in the offspring. The pollen equivalent cannot, like pollen itself, be collected and applied in the right quarter as with flowers; the material is too minute to handle and the chance of self-fertilization cannot be eliminated, besides all which, in sowing varietal forms, and it is only by sowing two very distinct types that any recognizable result is possible, there is always a great possibility of a purely independent "sport" occurring amongst the seedlings of either form, which may not owe its origin to cross influence at all.

We may now conclude by a few remarks on propagation by other means than spores. The usual methods of layering bulbils of proliferous fronds, or stolons of stoloniferous ones, are too well known to require description. Plants with creeping rhizomes, like the Polypodies, Davallias, &c., only require portions of such rhizomes or fleshy rootstocks to be severed with a frond or two and a growing point to be treated as rooted plants, and plants producing offsets laterally only require these to be prised off and planted for them to establish themselves at once.

There are, however, potentialities in some Ferns which are entirely latent, and can only be rendered effective artificially. The Hartstongue, of which there are so many beautiful forms, some of which, the Crispsums or frilled ones, are perfectly barren, is a case in point. This Fern in time forms a long caudex built up for some inches of persistent bases of the old dead fronds. Lifting such a plant and commencing at the bottom, these bases of a dark colour and sausage-shaped and from $\frac{1}{2}$ –1 in. long, can be forced off the central core by downward pressure one after another to the number of, it may be, several scores. When the top is nearly reached, the crown may be replanted and will speedily re-establish itself. Each of these bases will be found to be provided with a bundle of roots; these should be

snipped off close and the bases then well washed. Not the slightest sign of a bud will be visible, nor normally would one appear, but if these be merely laid upon clean moist silver sand in a glass jar or other transparent receptacle, and kept quite close in a well-lighted place out of bright sunshine, every one will in the course of a few weeks in the growing season, produce first a crop of tiny white pimples or buds, and then a number of rooting plants. One inch-long base taken from a robust specimen bore, in our own experience, no less than thirty-six plants. Other species, such as the *Polystichums*, are also prone to produce bulbils if the old caudex be damaged, provided all the dead portions be shaved clean off and the remains be treated on the jar system or potted up in very small pots and kept close. One rare variety thus drastically treated broke out into a rash of bulbils which yielded no less than eighty specimens. Experiments in this direction have been mainly effected on British Ferns, and it is very probable that the grower of exotics would find it profitable to continue them in connection with some of the rarer forms which are difficult to propagate on the usual lines.

[C. T. D.]

§ 2. CULTIVATION

Amongst plants grown for their decorative foliage and character Ferns hold a leading place. They are not "flowering" plants in the usual acceptance of the term, but they are intensely interesting from a structural point of view. Leaving out the *Selaginellas* and Club Mosses (*Lycopodium*), there are eighty or more distinct genera in the Fern family, and several thousand species. They are to be found in all parts of the world—in tropical, subtropical, and temperate regions north and south of the Equator; and there is great variation in height, appearance, division or non-division of the fronds, the method of veining, and the way in which the spores are borne. All these are matters, however, which interest the botanist more than the general grower. At the same time the latter must have a practical acquaintance with these matters, as he is in the great majority of cases compelled to raise his plants from the spores, or "seeds" as they are popularly called. How these spores produce new fern plants has been already dealt with at p. 213, and every Fern-grower should make himself acquainted with these facts.

During the past thirty years certain kinds of Ferns have increased immensely in popularity amongst market growers. Owing to their decorative character they are in demand all the year round, and there are now many growers who devote their best energies to supplying the most saleable varieties. There are others who also grow many of the rarer kinds for private establishments where an interest is taken in keeping up a good collection of Filices—as Ferns are scientifically called.

For market work Ferns are usually cultivated in span-roofed houses varying from 100 to 200 ft. in length and 12 to 20 ft. in width. Such houses are well provided with hot-water piping and water tanks, as heat

Commercial Gardening

and moisture are the great aids to the market grower in producing large crops with the utmost speed and economy. Even then he selects only those kinds that will stand the rough usage of being packed off to market without too much packing, and that will also stand the draughts and chills and variations of temperature to be met with during the winter months in Covent Garden and other markets. Of course glass houses of almost any description, so long as the cultural requirements are attended to, will be useful for Fern-growing, and some very fine crops indeed are turned out every day from most dilapidated-looking structures.

Apart from heat and moisture, Ferns generally are not lovers of ardent sunshine. During the winter the British climate is none too sunny, but during the summer months it becomes essential to shade the Fernhouses heavily with limewash or other mixtures to prevent the fronds assuming a yellowish tint that would in the great majority of cases prevent the plants from being sold.

As all the plants are grown in pots varying in size from $2\frac{1}{2}$ to 5 in. and 6 in. diameter, the Fern-grower is a good customer to the maker of pots. To accommodate these the houses are usually fitted up with stages made of wood battens or concrete—at the sides and centres also in large houses—and house after house is often filled with the same variety. In a market-Fern nursery plants are to be seen in all stages of development—from the spores that have just been sown to the finished article packed ready for market. There is a constant change and displacement going on, and as quickly as one house is emptied of its saleable contents it is filled with others in a less-advanced stage.

Soil.—This is of great importance to Fern-growers not only on account of its character, but also of its cost. The best growers have to buy in hundreds of tons of top-spit or loamy soil, and this is stacked up until it has matured and is ready for use. It is often placed in layers 1 or 2 ft. thick, with an alternate layer of well-decayed manure 1 ft. or so thick between, and is thus left for two or three years to settle down and sweeten by exposure to the weather. When required for use it is chopped down with a spade, passed through a sieve, and may have some well-rotted leaf mould or a little peat mixed with it, and perhaps a dash of sharp silver sand. The whole is thoroughly mixed, and is then ready for use—at least for potting purposes.

Of late years the question of sterilizing the soil for Fern-growing has become prominent owing to the outcry made against eelworm and injurious bacteria—these being often the imaginary products of men who have never grown a Fern in their lives. Some growers make a point of sterilizing the soil in which spores are to be sown, others sterilize for all purposes, and others again never dream of sterilizing their soil; and each one produces good saleable plants. The sterilizing process may be done by placing the soil in iron receptacles which are heated in the furnace, or if steam or boiling water is available the soil may be saturated with one or the other. In this way it is possible to kill eelworm, injurious and perhaps also beneficial

bacteria, and, what may be still more important, the spores of mosses, fungi, and the seeds of weeds. Thus, when the spores of a desired variety are sown on a sterilized soil, one may assume that the resulting vegetation is fairly clean and true to name.

According to Hornberger, Ferns generally are made up of 97.292 per cent of organic matter, and 2.708 per cent of ash. The latter is made up as follows:—

Iron oxide ...	...	...	...	...	0.042
Potash ...	...	...	...	...	0.132
Soda ...	...	...	...	...	0.579
Magnesia ...	...	...	...	...	0.181
Manganese oxide ...	...	...	...	...	0.132
Silica ...	...	...	...	...	1.356
Phosphoric acid ...	...	...	...	...	0.121
Sulphuric acid ...	...	...	...	...	0.167

It will be noticed that *lime* is apparently non-existent, while silica is the predominating constituent of the ash. Although not absolutely essential for plant growth according to experimental researches, the presence of silica (or flint) in the shape of sand is essential to give that rigidity and firmness to the stems of Fern fronds.

Sowing Fern Spores.—To secure spores the fertile fronds of any particular species or variety are picked off the plants and placed in thin paper bags and labelled. The bags are hung up in some dry warm spot, and in due course the spores drop out of the cases and form a dark-brown dust within. The spores of all kinds of Ferns are very small and dust-like, hence great care is necessary not to sow too thickly.

As a rule, 5-in. pots (48's) are most favoured for sowing Fern spores, but other sizes may, of course, be used. The pots are well crocked to secure perfect drainage, and are filled up to within about $1\frac{1}{2}$ in. of the top with good fibrous loam. On this a layer of finer and grittier compost, sterilized for preference, is placed, and made fairly firm and level with a piece of flat board. All the pots ready for sowing are prepared thus and then well watered with a fine-rosed watering pot. An hour or two afterwards the spores are sown as thinly as possible over the surface—a delicate operation that can only be acquired by practice—and a piece of glass is put over each pot. A place shaded from the sun is selected, and attention is given each day to watering. This is best done by plunging each pot into a bucket or tank of water so that the liquid rises from beneath upwards. In applying water overhead there is always a danger of washing the spores to one side of the pot and making ugly holes in the surface.

Pricking Off.—As soon as the first little true frond or two are seen above the thin semi-translucent prothallus (see p. 213) the young Ferns will be ready for pricking out. For this purpose 5-in. pots, or shallow cutting boxes, are filled with the Fern compost already described, and one, two, or three little plants are lifted with the point of a penknife, or a stick, and gently pressed into the soil. The little plants are afterwards carefully

watered and kept in shaded spots. They grow freely if the temperature is kept up to about 65° to 75° F. at night, and in a few weeks are ready for transferring into 2½-in. or 3-in. pots singly, or two or three together in a 5-in. pot.

This method of raising Ferns from spores applies to almost every species and variety. In practice, however, it is found more convenient with some of the *Aspleniums*, like *bulbiferum*, *biforme*, &c., to detach the plantlets or bulbils on the fronds and treat them exactly in the same way as the young Ferns raised from spores. Most of the *Nephrolepis* are propagated by means of the stolons or runners that are freely produced.

In this work only the most remunerative kinds of Ferns are alluded to. Readers interested in others are recommended to consult *The Gardener's Assistant*.

Insect Pests, &c.—Generally speaking thrips and aphides are the worst enemies of Ferns, but they can be kept in check by the use of nicotine, soft-soap, and quassia solutions being freely applied when necessary; or by vaporizing the houses. A pest known as the "mite" has, however, practically defied all remedies, and thousands of market Ferns—chiefly *Pteris cretica* and its varieties, and the *Aspleniums* of the *bulbiferum* section—have been destroyed by its attacks. Vaporizing, syringing, and fumigating have proved useless, and there was nothing left but to burn infected stock, clear out and sterilize the soil by burning, and cleanse the houses by thoroughly washing with hot limewash and paraffin emulsions—operations that meant a considerable reduction in the profits of the grower for market. In some cases where none of these proceedings were carried out, and were even despised, the loss was suffered as an "act of God", and allowed to wear itself out. This it did in two or three years, apparently the result of over-production and suffocation on the part of the Fern mite. With this disease, as most others, it will pay the grower to keep his soil sweet and pure by exposure to the weather before use, by attention to proper ventilation and keeping up a "buoyant" atmosphere, and by attention to careful watering.

§ 3. KINDS OF FERNS

Acrostichum.—A large genus of Tropical Ferns, few of which are grown in any large quantity. There is great variation in the shape of the fronds, but all agree in having the spore clusters

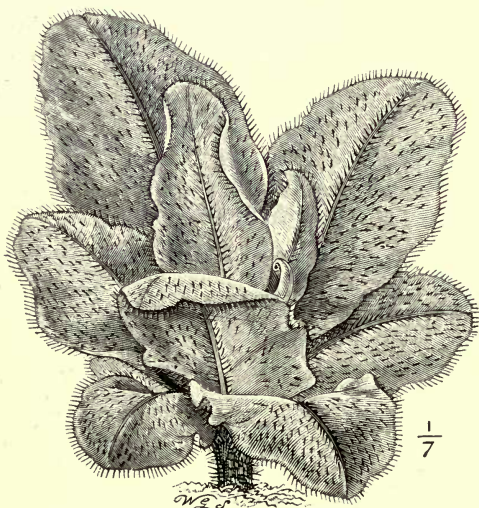


Fig. 310.—*Acrostichum crinitum*

spread over the surface of the fertile ones. Two of the most interesting species are: *A. crinitum* (fig. 310), from the West Indies, which has large simple fronds, the sterile ones being 12–18 in. long, and covered with long black hairs; and *A. pettatum*, from Tropical America, a species having fronds only about 3 in. long, divided into numerous narrow segments. There are several other species, all requiring stove treatment. They are of no value for market work.

Actiniopteris.—The best-known member of this genus is *A. radiata*, a distinct and pretty little Tropical Fern easily recognized by its fan-shaped fronds being cut into numerous radiating narrow segments. The variety *australis* is stronger in growth, and has fewer and more pointed segments. Requires stove treatment. It is a native of the East Indies and Abyssinia, and other parts of Africa.

Adiantum (MAIDENHAIR FERN).—A very popular genus recognized by roundish or linear sori (i.e. clusters of spores) arranged on the edges of the pinnules or leaflets, forked veins with free veinlets, and usually black shining stems (stipes) and rachis. A peculiarity of the genus is that it is impossible to wet the fresh fronds even by dipping them in water, hence the generic name, which means “dry”.

Maidenhair Ferns flourish in a compost of equal parts of loam, leaf mould, and silver sand, but they must not be potted too hard. Established plants like plenty of diffused light but not direct sunshine, and they do not like being watered or sprayed overhead. The best market kind is *A. cuneatum elegans*, which is always in demand and sells in all sizes from 2½-in. pots upwards. Other good varieties are *Collisi*, *macrophyllum*, *Victoriæ*, *rhodophyllum*, *scutum*, *Pacotti*, *Legrandi*, *tinctum*, and *fulvum*. These are compact in growth, and have for the most part deeply tinted fronds.

A. Farleyense, the “Queen of Maidenhairs”, is a sterile or almost sterile form of *A. tenerum*, and is most valuable for its cut fronds. A form of it has recently appeared under the name of the “Glory Fern”. Such *Adiantums* as *elegantissimum*, *trapeziforme*, and *Williamsi* are taller-growing kinds mostly grown in 5-in. pots; while *ciliatum*, *dolabrifforme*, *caudatum*, *assimile*, and *Moorei* are seen to the best advantage grown in baskets. *A. Mariesi* is a very useful Maidenhair Fern. It grows quickly, and soon makes strong bushy plants for 3-in. or 5-in. pots. *A. fragrantissimum* is another strong-growing form; and *A. decorum*, with its slightly tinted fronds, is worthy of greater attention for market, as it stands well and is good for cutting.

There is still a good market trade done in cut fronds of *A. cuneatum*, but not nearly so much as in former years. *Asparagus Sprengeri*, as well as *A. plumosus* and its variety *nanus*, has interfered a good deal with the cut Maidenhair trade, which some twenty years ago was very lucrative. Bunches containing three dozen or four dozen fronds then realized as much as 8*d.* or 9*d.*, but now half the price is considered good.

Alsophila.—A genus of ornamental tree Ferns from temperate and

tropical regions, chiefly valuable for the decoration of large conservatories, &c., where plenty of space is available. Amongst the best-known kinds are *A. excelsa*, which is practically hardy in the mildest parts of the kingdom; *A. Rebeccæ*, from Australia, another fairly hardy species; *A. australis*, a beautiful Australian tree Fern requiring coolhouse treatment; while *A. aculeata* (or *ferox*) and *A. armata*, both from Tropical America, should be grown in the stove.

Anemia.—This genus is recognized by having the sterile branches once, twice, or thrice pinnately divided, the two lower side branches being erect and spore-bearing, and quite distinct from the other fronds. These Ferns (all natives of Tropical America) are seen occasionally in market, in small (2½-in.) pots, as they are somewhat too tender. The kinds grown are *A. Phyllitidis*, which has many varieties; and *A. rotundifolia*, having long narrow drooping fronds with roundish pinnæ about 1 in. wide, tinted with purple when young.

Angiopteris evecta.—This is a remarkable Fern from the Old World Tropics, having twice or thrice pinnate fronds 6–15 ft. long, and gracefully spreading. It requires stove treatment; but owing to its great size is only met with in large establishments. Small plants, however, are obtainable for 3s. or 4s.

Aspidium (SHIELD FERN).—A very large genus, now including *Cyrtomium* and *Polystichum*, and having representatives in the tropical and temperate regions. *A. (Polystichum) aculeatum* is a well-known species called the “Hard or Prickly Shield Fern”. It has twice-pinnate stiffish fronds about 2 ft. long, and is quite hardy. *A. angulare*, the “Soft Shield Fern”, is considered a variety of it, but is a very distinct plant; and there are almost innumerable varieties having the fronds beautifully crested, lobed, and tasselled, and much admired by hardy-Fern specialists.

A. (Polystichum) Lonchitis, another hardy species, known as the “Holly Fern”, must not be confused with the greenhouse species *A. (Cyrtomium) falcatum*, also called “Holly Fern”. It grows wild in the Scottish Highlands and has fronds 1–2 ft. long.

A. (Cyrtomium) falcatum.—This is the “Holly Fern” of the market grower. It is found widely distributed in Japan, China, the Himalayas, Madagascar, the Sandwich Islands, and South Africa. It is grown in thousands for market, and may be recognized by its ovate pointed pinnæ, which, in the glossy-green colour and appearance, remind one of some varieties of Holly. The variety *caryotideum* is somewhat larger, more sharply toothed, slightly lobed, and sometimes auricled on both sides at the base. *Rochfordi* is a very beautiful variety with large fimbriated fronds. It is a great improvement on the type, and is a strong grower. It stands travel well, and is likely to become better known in market work. It is easily raised from spores. Another variety is *Fensoni*. The spore clusters are scattered over the lower surface. The Holly Fern is easily grown in a cool greenhouse, and is very popular for house decoration, cool ferneries, &c. It flourishes in loam, peat, and sand in equal propor-

tions, and requires plenty of water during the summer months. All varieties sell freely in small or large pots.

A. (Lastrea) aristatum variegatum.—A beautiful greenhouse Fern from the East Indies, Assam, &c., often known under the name of *Lastrea*. It is largely grown for market, and is an excellent plant for winter work. The shining-green, thrice-pinnate fronds are variegated with ivory white or pale yellow along the centres of the pinnæ, the colour being improved by exposing the plants to sunlight.



Fig. 311.—*Asplenium Nidus australasicum*

Asplenium.—A genus containing three hundred or more species from all parts of the world. They are characterized by having linear or oblong sori on the under surfaces or near the margins of the fronds, and the veins are forked or pinnate, free.

Only a few kinds are grown largely for market work, amongst the best being: *biforme*, often mistaken for *bulbiferum*, but being more compact in growth; *Belangeri*, a native of Java, with finely divided fronds; *bulbiferum*, the well-known "Carrot-top Fern", with graceful arching fronds that produce bulbils or offsets freely, as the name indicates; *A. Colensoi*, *A. feniculaceum*, *A. Hilli*, *A. inaequale*, *A. lucidum*, and *A. erectum* are other kinds

that sell best in 3-in. pots, and are wanted at all times. *A. Nidus*, the "Birds' Nest Fern" from Australia, has become a very popular market Fern of late years, and it is not unusual for one firm alone to have an annual output of 60,000 to 70,000 plants in 3-in. pots, besides large numbers in 5-in. and 7-in. pots. The large shining-green fronds forming a cuplike cluster are highly decorative. The variety *australasicum* (fig. 311), has a black and sharply keeled rachis, while *multilobum* or *multilacerum* has the upper portion of the fronds cut into crested or pinnatifid segments.

Blechnum.—A genus of handsome low-growing tree Ferns closely related to and resembling the Lomarias, from which, however, they may be distinguished by having the spore clusters in lines parallel with and usually contiguous to the median nerves. Amongst the kinds requiring greenhouse treatment are *B. australe*, from South Africa, and *B. cartilagineum*, from Australia. *B. brasiliense* and *B. Lanceola*, both from Tropical America, should be grown in the stove, and with them *B. occidentale*, a pretty species in which the young fronds are brightly tinted.

Brainea insignis.—A pretty Chinese tree Fern with salmon-tinted young fronds. In a small state it is worth growing, but it is at present practically unknown to marketmen. The same may be said of other Fern genera, like *Cyathea*, *Cystopteris*, *Didymochlæna*, *Deparia*, *Hemionitis*, *Hemitelia*, *Hymenophyllum*, *Hypolepis*, *Lindsaya*, *Meniscium*, *Nothochlæna*, *Platycerium* (the Stag's Horn Ferns), *Woodsia*, and *Woodwardia*—representatives of which are grown by specialists chiefly to meet the needs of private collections. They all have a certain value, but that is a matter settled by the buyer and seller according to circumstances.

Cheilanthes.—A large genus of ornamental Ferns with gracefully cut fronds. The spore clusters are roundish, and situate near the ends of the free veins. The only species of market value is *C. elegans*, the Lace Fern, and even this is rarely seen. It is a form of the Tropical American *C. myriophylla*, and has fronds 10–20 in. long, thrice-pinnately cut into small pouch-shaped pinnules—smooth above, hairy beneath. It grows freely in a warm greenhouse, and sells best in small pots.

Davallia (HARE'S FOOT FERN).—The Davallias are graceful Ferns with creeping hairy rhizomes, bearing some fancied resemblance to a hare's foot. The spore clusters are marginal and the veins free. Of the large number of species comparatively few find a place with the market grower. Amongst the best may be mentioned *D. bullata* and its varieties *decora* and *Mariesi*, the latter being very popular for the extraordinary shapes into which it is made by the Japanese—frogs, toads, monkeys, balls, &c. *D. canariensis*, *D. dissecta*, *D. tenuifolia*, *D. stricta*, *D. Tyermanni*, *D. Speluncæ*, *D. Griffithiana*, and others are sometimes brought to market chiefly in baskets. They are all graceful in appearance, but may be grown as easily in pots as in baskets.

Dicksonia (*Cibotium*) *Schiedei*.—This is a Mexican tree Fern 10–15 ft. high when full grown. It is an excellent Fern, and sells by the thousand in America. It has not yet "caught on" with British growers, but its

elegant character is sure to force itself upon them in time. As a room Fern it is very valuable, as I have known it to stand in a dining-room, heated by gas throughout the winter, without suffering any ill effects. The oblong deltoid fronds are thrice pinnate with oblong lance-shaped pinnæ and linear lance-shaped pinnules. The spore clusters are near the margins at the end of the veins.

Doodia aspera multifida.—A pretty Australian Fern, compact in growth, chiefly valuable for the charming rosy tints on the young fronds. When full grown the fronds are 6–12 in. long and pinnatifid, but young plants in 3-in. pots sell best.

Doryopteris palmata (IVY-LEAF FERN).—A Tropical American Fern, also known as *Pteris*, having palmate fronds 4–9 in. long divided into narrow dark-green segments. Although ornamental and easily grown, this species and a variety called *geranifolia* are not in much demand.

Filmy Ferns.—See on page 234.

Gymnogramme (GOLD AND SILVER FERNS).—This genus contains handsome Ferns, with naked and narrow clusters of spores and free-forked veins. Some of the kinds have the under surface of the fronds densely covered with a white floury powder, others with a golden powder, hence the popular names. Unfortunately this gold and silver powder suffers a good deal when plants are taken to market; hence there is not such a trade done in *Gymnogrammes* as their beauty would warrant. They

grow well in a compost of fibrous peat, leaf mould, and silver sand, and as a rule like a fair amount of light and a well-ventilated house with a dryish atmosphere. The best market varieties are such forms of the Tropical American *G. calomelanos* as *Alstoni*, *Martensi*, and *G. peruviana argyrophylla*, to which may be added *G. tartarea ochracea*, *G. pulchella Wettenhalliana*, and *G. schizophylla* (fig. 312).

Hemionitis.—There are several species in this genus, recognized by the spore clusters being continuous along the copiously netted veins, and also sometimes developed slightly between them. The best market kinds are *H. cordata*, from India, Ceylon, the Philippines, &c., having simple, entire, heart-shaped, deep-green fronds; and *H. palmata*, having hairy palmate fronds with oblong crenulate segments. Both kinds are compact in growth, and a limited trade is done in them when grown in small pots.

Lomaria.—This genus is closely related to *BLECHNUM*, but is dis-

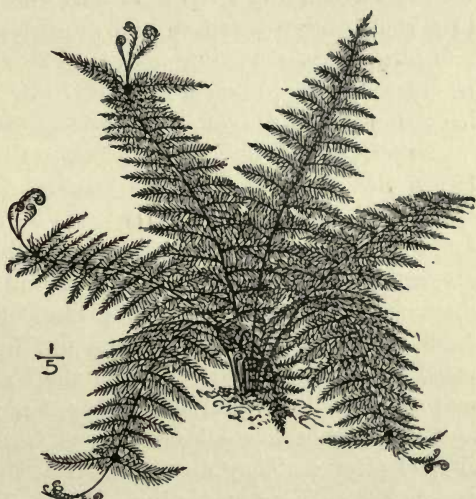


Fig. 312.—*Gymnogramme schizophylla*

tinguished from it by having the spore clusters on the margins instead of parallel with or contiguous to the midrib. The best market kinds are *L. gibba* and *L. ciliata*. The former has pinnatifid fronds, 1-2 ft. long when full grown, deep green and elegantly waved; while the latter (*L. ciliata*) has fronds 6-12 in. long, divided almost down to the rachis or midrib, the segments being deeply cleft and with fine teeth-like hair on the margins. Both kinds are natives of New Caledonia, and may be regarded as miniature tree Ferns of quick and easy growth in a warm greenhouse.

Lygodium.—This genus contains the elegant "Snake's Tongue" or "Climbing Ferns", recognized by their climbing stems, conjugate, palmate, pinnate or pinnatifid fronds, forked free veins, extending beyond the margin, and there forming compressed distichous spore-bearing spikelets.

L. japonicum, which is found from the Himalayas to Japan and North Australia, is one of the most popular for market work. *L. pinnatifidum* is a fine strong-growing species also useful. They both flourish in a rich spongy compost, and require abundance of water during growth and also frequent syringings from May to October. *L. japonicum* should be treated as a coolhouse Fern, and may, indeed, be grown without artificial heat; but *L. pinnatifidum* requires warm greenhouse or stove treatment.

Nephrodium (including *Lastrea*).—A very large genus midway between the Aspidiums on one hand and the Nephrolepis and Polypodiums on the other. Representatives are to be found in all parts of the world, and are characterized by having a kidney-shaped indusium over the spore clusters, free or anastomosing veins, and fronds pinnate or compound. For market purposes the most important kinds are *N. lepidum*, a Brazilian species, having a tufted caudex and light-green pinnate fronds with serrated pinnules. *N. patens*, from the Tropics, has fronds 1-3 ft. long when mature, with deeply cut, lance-shaped pinnæ. *N. erythrosorum*, from Japan and China, has ovate lance-shaped fronds 12-18 in. long, cut into lance-shaped pinnæ. They are beautifully tinted with bronzy red when young, and are then very attractive and saleable. These three species are easily grown in a greenhouse, and like plenty of water. They sell best when grown in 5-in. pots, realizing from 6s. to 12s. per dozen.

Amongst hardy kinds the best known are *N. Filix-mas*, the "Male Buckler Fern", which has fronds 1-3 ft. long; *N. dilatatum*, the "Broad Buckler Fern"; *N. Oreopteris*, the "Mountain Buckler Fern"; *N. Thelypteris*, the "Marsh Buckler Fern"; and *N. spinulosum*. In the spring-time quantities of the stems of these find their way to market and meet with a fairly ready sale.

Nephrolepis.—The members of this genus are popularly known as "Ladder Ferns" or "Fishbone Ferns", chiefly from the shape of the fronds of *N. exaltata*, the best-known and still most generally useful species. The plants are distinguished by the slender runners or stolons so freely produced from the old stems, by the pinnate fronds, free veins, roundish spore clusters, arising from the apex of the upper branch of a vein, usually near the margin, and by the kidney-shaped or roundish indusium.

N. exaltata, from Tropical America, has been grown for many years as a market plant, and hundreds of thousands are still grown hanging from the rafters in greenhouses. Of late years many charming varieties have arisen, and are chiefly remarkable for their feathery or plumose appearance, many of them being almost "mossy" in character, and of a soft delicate green. Amongst the best of these plumose forms are *todeoides*, *Whitmanni*, *Amerpohli*, *Rochfordi* or *Marshalli*, *compacta*, *lycopodioides*, and *elegantissima*; while among those with long drooping fronds most suitable for growing in baskets or on elevated rockeries in the greenhouse or stove are *Piersoni*, *Fosteri*, *davallioides*, *tuberosa*, and *Scotti*. The last-named is an elegant variety that can be grown to perfection in a 5-in. (48) pot, while it is also effective as a basket plant. For table decorations such kinds as *cordata compacta*, *Duffi*, *Mayi*, *pectinata*, *philippinensis*, and *Westoni* are valuable. There are also several crested or deeply cut varieties, amongst the best being *Westoni cristata*, *cordifolia tessellata*, *rufescens tripinnatifida*, and *davallioides furcans* (fig. 313)—all beautiful. To these may be added *Neuberti*, a variety of splendid habit, plants in 6-in. pots being quite 2 ft. across. It is comparatively new, but will become better known. Generally speaking the various species and varieties of *Nephrolepis* flourish in a mixture of peat, leaf mould, and silver sand. Being natives of the Tropics they require plenty of heat and moisture in summer, and must not be kept too dry or too cool during the winter season.

The propagation of the numerous feathery varieties of *Nephrolepis* now in cultivation is fairly simple. As they do not develop spores like the old *N. exaltata*, they are chiefly raised from the runners that are thrown out from the base of the parent plants, in the same way as Strawberry runners. The old plants are plunged in a bed of sandy peat and leaf mould, and as the runners appear they are pegged down to root. When the young plants arising from the runners are sufficiently advanced they are detached and potted up separately. As to the general cultivation of these feathery *Nephrolepis* the following advice of an American grower of the "Boston Fern", as *N. Piersoni* is called, may be useful:

"In our experience with several thousand *Piersoni* plants, we find they require a very rich soil after they get started to grow. We use ordinary Carnation soil, one-half rotted cow manure. After they get the pots filled with roots they will stand feeding often, and at no time should they be

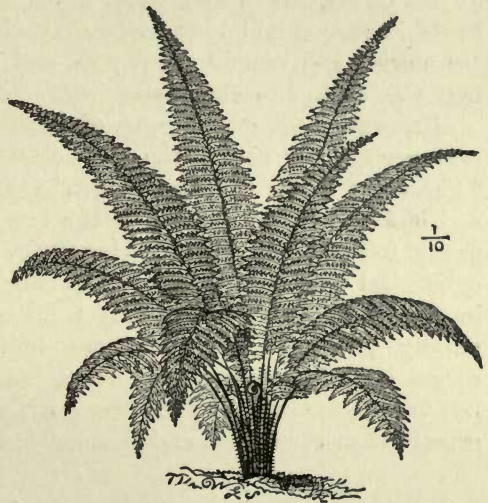


Fig. 313.—*Nephrolepis davallioides furcans*

allowed to suffer from want of water. Plenty of room and light are also very important. It seems to be the impression that too high or too low a temperature is the cause of sporting back, but we are satisfied this is not the case, having tried them in temperatures from 45° to 75° F. and had no trouble except with a few that got potbound or stood too close to the steam pipe and died out frequently. While we do not pretend to be authorities on this subject, we would advise anyone having any trouble with Pierson Ferns to give them better soil, and see that they never dry out. You will soon have them looking different, and the imperfect leaves may be cut off. *Piersoni* does not lift well from the bench if very large. If you want fine, large plants, keep them in pots, and plunge the pots in soil or moss."

Onychium japonicum.—This is a free-growing little Fern, native of Japan, China, North India, &c., having mature fronds 1 ft. or more long, ovate in shape, and four times divided into numerous segments. Plants for market sell best in small pots, and may be grown in a cool or warm house according to circumstances.

Osmunda.—A small genus of Ferns remarkable for their distinct appearance and for having the spore clusters borne on separate fronds. The "Flowering Fern" or "Royal Fern" (*O. regalis*) is the best-known species, and is found in many parts of the temperate and subtropical regions. It grows from 6-8 ft. high, having twice-pinnate barren fronds, and erect cylindrical trusses of fertile fronds thrown up in the centre. Small plants in 3-in. or 5-in. pots sell well, and are easily grown in a cool house. The variety *palustris* requires more humid conditions, and the variety *corymbifera* is a rare crested form. *O. Hilli* is more compact in growth, but is a fine plant. *O. javanica*, a native of Java and Ceylon, is of slower growth than the others, and is somewhat stiffer in appearance.



Fig. 314.—*Platycerium Willdenkii*

Pellaea.—A small genus with pinnate or twice-pinnate fronds more or less leathery in texture, having free venation, marginal sori, with the edges of the pinnæ in some species bent back to form a spurious indusium. Several kinds are grown in small quantities, amongst the most popular being *adiantifolia*, *alabamensis*, *atropurpurea*, *Calomelanos*, *cordata* and its variety *flexuosa*; *falcata*, *geraniæfolia*, *gracilis*, *hastata*, *intramarginalis*, *involuta*, *mucronata*, *rotundifolia*, and *ternatifolia*. The last-named and *P. Calomelanos* require stove treatment, but the others are easily grown in a greenhouse.

Platycerium (STAG'S HORN FERN).



FERNS (*PTERIS CRETICA MAJOR*) GROWN FOR MARKET



FERNS (*ASPENIUM BULBIFERUM*) GROWN FOR MARKET

—These are distinct-looking Ferns with two kinds of fronds—those bearing spores in irregular patches beneath being forked and lobed, while the sterile ones are large, flattish, and imbricating. The best-known kinds are: *athoipicum*, *alcicorne*, *biforme*, *grande*, and *Willincki* (fig. 314), all requiring greenhouse treatment.

Polypodium.—A large and variable genus, now including *Phegopteris*, *Goniopteris*, *Phymatodes*, *Drynaria*, and other submerged genera. The most characteristic feature of the Polypodies consists in the roundish spore clusters being without any covering or indusium.

Of the 500 or more species known, *P.* (or *Phlebodium*) *aureum*, from Tropical America, is undoubtedly the most popular. It is largely grown for market, and is sold in pots of all sizes. The fronds are from 2-6 ft. long, pinnatifid, with wavy blue-green segments, on the under surface of which the spore clusters are arranged in two rows on each side of the midrib. It makes splendid specimens, and stands a good deal of rough usage. *P.* (*Phymatodes*) *glaucom*, from the Philippines, resembles some forms of *P. aureum* in texture and general appearance. Its fronds, however, are of a deeper blue-green tint, and the habit is somewhat more slender. The variety *crispum* is an elegant plant, but does not produce spores. *P. aureum cristatum* is a nice crested variety, and *areolatum* is a decorative form which may be recognized by having a single row of spore clusters. *P. Mandaianum* is a fine new variety, with blue-green deeply cut fronds.

Amongst the hardy Polypodies which are dug up in spring and sent to market are the Common Polypody (*P. vulgare*), with narrow evergreen fronds 6-12 in. long. There are several varieties of it, some being beautifully feathered and crested. The "Oak Fern" (*P. Dryopteris*) and the "Beech Fern" (*P. Phegopteris*) are also popular for hardy rock gardens and ferneries.

Pteris.—A large genus characterized by having the spore clusters borne in a continuous line along the margins of the pinnæ. Of the many species and varieties the market kind *par excellence* is *Pteris cretica major*. This is grown in hundreds of thousands, and there are a good many variations in it. The fronds, however, are gracefully arching, and divided into ribbon-like wavy pinnæ, hence the popular name of "Ribbon Ferns". One of the best is *Drinkwateri*. There are several crested and tasselled varieties also, the most popular at present being *cristata* and *Wimsetti*. Others are *albolineata*, *Childsi*, *gracilis*, *Ouvrardi*, *Leyi*, *Mayi*, *nobilis*, &c. *Childsi* is a very graceful Fern with deeply serrated fronds nicely crested at the tips. It is barren, and must therefore be raised by division. A form of *Wimsetti*, called *multiceps*, is very distinct, and is remarkable for the creasing of the inner pinnules. It may be reproduced true from spores. The forms sell well in 5-in. pots. A new variety called *Parkeri* is a distinct improvement, and is likely to become a fine market Fern if not too coarse. It has larger and broader fronds than the *Cretica* forms, and, owing to their leathery texture, will stand a good deal of rough usage.

P. serrulata and its varieties, recognized by having winged rachises, are also popular market Ferns, and sell in all sizes, those in 5-in. pots being most in demand.

P. tremula—the “Trembling Fern” of Australia—a vigorous species with fronds 1-3 ft. long and four-times pinnate, is a fine market Bracken, and chiefly sells in 5-in. and 6-in. pots. There are several forms of it, the best being *flaccida* and *Smithiana*, densely crested. Other good market Pterises are *P. arguta*, *P. biaurita*, and its varieties *argentea* and *nemoralis*; *P. hastata*, and *P. straminea*.

Scolopendrium.—The best-known member of the genus, and the one having the greatest commercial value, is the common Hart's Tongue Fern (*S. vulgare*). The typical species

is found growing wild in the copses and hedgebanks, and between rocks, in many parts of the British Islands, and is also distributed over North Africa, West Asia, Japan, and North-west America. It has short stoutish rootstocks, and tufts of strap-shaped, bright-green leathery fronds 6 to 18 in. long. The “sori”, or clusters of spore cases, are arranged in streaks almost at right angles to the midrib, but vary considerably in length and number. There are now almost innumerable varieties in cultivation, one hundred or more of which have been regarded

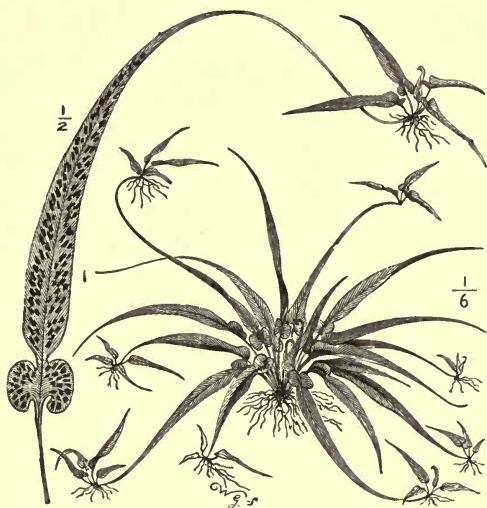


Fig. 315.—*Scolopendrium rhizophyllum*

as first-class garden plants by experts. The variations consist chiefly in the extraordinary way in which the simple fronds of the type have been modified into all kinds of shapes by creasing and laceration. Many of these varieties, it must be admitted, are mere vegetable monstrosities, curious rather than beautiful, but others are very ornamental in appearance.

The Hart's Tongue Ferns are now largely used for planting in moist and shady parts of the rock garden and flower border, or beneath overhanging trees and shrubs. They are all quite hardy, and flourish in sandy loam, peat, and leaf soil in about equal proportions. They are also excellent subjects for growing in cold greenhouses without any heat whatever.

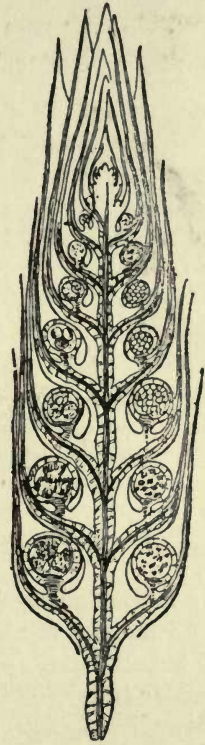
A very curious species is *S. rhizophyllum*, the “Walking Fern” of North America (fig. 315). The simple fronds taper to a point and have a pair of rounded auricles at the base, while new plantlets are developed at the tips of the fronds under favourable conditions. It is practically hardy in most parts of the kingdom.

Selaginella.—Although belonging to a quite different family (the

Lycopodiaceæ), the Selaginellas are popularly regarded as Ferns, and are culturally treated as such. There are over 300 species known, one—*S. spinosa* (or *selaginoides*)—being a native of Britain. The plants are easily recognized by the stems bearing four rows of scalelike leaves—two rows of small ones on the upper surface, and two rows of larger ones at the sides—one large leaf and one small one arising at each joint. The reproductive organs—sporangia—are borne at the tips of the shoots in angular conical spikes (fig. 316 *c*). There are two kinds of sporangia—"megaspore" and "microspore". Each megaspore usually contains four large "megaspores" or "macrospores", and each microsporangium contains a large number of small microspores (fig. 316). The latter are



A Frond with spore-bearing spikes or cones (c),
nat. size.



Section of Spore-bearing Cone,
showing Megaspore-bearing on left
and Microspore-bearing on right

Fig. 316.—*Selaginella inaequalifolia*

usually borne in the axils of the upper scale leaves, while the former are in the axils of the lower. The process of fertilization is practically the same as in the Ferns (see p. 213).

Comparatively few Selaginellas are grown on a large scale for market. They require a close moist atmosphere, and will flourish in a light compost suitable for Ferns generally. Propagation is effected either by cuttings of the stems having rootlets or by spores. Among the smaller-growing kinds worthy of notice are *S. apus* or *apoda*, *S. cæsia* or *uncinata*, *S. Kraussiana* (or *denticulata*), and its varieties *aurea* and *variegata*. These grow from 1-3 in. high, and have trailing stems and an ornamental mosslike

appearance. The true *S. denticulata*, from the European Alps, is a slower-growing kind than *S. Kraussiana*, and is almost hardy. *S. Emiliana* grows about 9 in. high, and *S. Martensi* and its variegated form are good free-growing plants. *S. Emiliana aurea* is a golden form raised by Messrs. J. Hill & Son. It is becoming one of the most popular for market work. The same may be said of *perelegans*. *S. amoena*, a variety of *caulescens*, however, is the best of all, and is a very charming kind. Of the variegated kinds, *S. Watsoniana*, with silvery-white shoots, is one of the best.

Todea africana (or *T. barbara*).—A bold and ornamental South African Fern having a thickish bolelike stem and twice-pinnate fronds, 3–6 ft. long, with serrated pinnæ, and dense masses of reddish-brown spore clusters. It

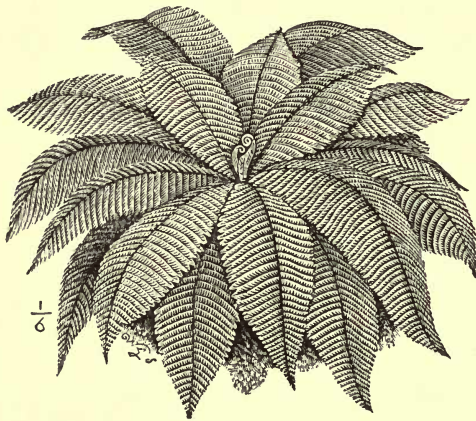


Fig. 317.—*Todea superba*

makes a compact plant when well grown, and is a very useful Fern for market work. It should be grown in a close damp atmosphere and shaded from the sun. *T. superba* (fig. 317) is a charming New Zealand Fern with gracefully spreading feathery-looking fronds. It requires to be treated as a Filmy Fern, described below.

[A. J. H.]

Woodisia.—A genus of dwarf tufted ferns with pinnate fronds and roundish clusters of spore cases. They may be grown in the same way as the Hart's Tongue

Ferns, in moist and shaded spots. The best-known kinds are: *hyperborea* (*alpina*), from the wet alpine rocks of North Wales and Scotland, having tufts of lance-shaped fronds 3 to 6 in. long; *ilvensis*, closely related but with broader fronds; *obtusa*, from North America, and *polystichoides*, from Japan, are other species.

Woodwardia.—A genus with half a dozen species of ornamental Ferns having large twice-pinnate fronds, and linear sori sunk in the cavities of the fronds in single rows parallel with and contiguous to the midribs of the pinnæ and pinnules. The plants are hardy in the mildest parts of the kingdom, but require greenhouse protection in other places. *W. areolata* has fronds 6 to 12 in. long; and *W. virginica* about 6 in. longer, both kinds from North America. *W. japonica*, with fronds 1 to 2 ft. long, and *W. orientalis*, with fronds 4 to 8 ft. long, come from China and Japan. The best-known kind, however, is *W. radicans*, from the northern subtropics. It has graceful fronds 3 to 6 ft. long and 1 to 1½ ft. broad, divided into lance-shaped pinnæ each of which is cut down almost to the midrib into finely toothed pinnules. The variety *cristata* is beautifully and symmetrically crested.

Filmy Ferns.—This name has been applied to various species belonging

to the genera *Hymenophyllum*, *Todea*, and *Trichomanes*. Owing to the peculiar atmospheric conditions necessary for their successful culture, Filmy Ferns are not a very marketable commodity. They are wonderfully beautiful and elegant in appearance, the fronds in many cases resembling the more delicate and more finely divided kinds of green seaweeds. Most of them must be grown in close cases in a cool atmosphere that is always highly charged with moisture. They are planted in a mixture of fibrous peat and loam to which some sphagnum moss and a little broken charcoal are added; and they are usually planted in a kind of rockery made of pieces of rock. Several kinds, however, do well when tied to pieces of tree-fern stem or blocks of peat, more especially those having more or less creeping rhizomes. Water is best applied carefully to the rocks or pieces of stem on which the plants are growing, and the fronds may be "dewed" occasionally with a fine spray from the syringe. The best-known kinds of Filmy Ferns are *Hymenophyllum tunbridgense*, *Trichomanes radicans*, (the Killarney Fern), and *Todea superba* (fig. 317).



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